

**TECHNICAL MANUAL**  
**MAINTENANCE INSTRUCTIONS**  
**DEPOT**  
**ON CONDITION MAINTENANCE**  
**AIRCRAFT ENGINE**  
**USAF MODEL**  
**F100-PW-229**

PRATT & WHITNEY  
LARGE MILITARY ENGINES  
UNITED TECHNOLOGIES CORPORATION  
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THIS PUBLICATION IS ONE OF A SET OF TWELVE MANUALS. THE COMPLETE SET CONSISTING OF T.O. 2J-F100-53-1 THROUGH T.O. 2J-F100-53-11 AND T.O. 2J-F100-11-2 IS REQUIRED FOR DEPOT MAINTENANCE.

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**RECORD OF CHANGES**

Original . . . . .	15 Aug 91	Change 15 . . . . .	15 Nov 95
Change 1 . . . . .	15 Nov 91	Change 16 . . . . .	15 Feb 96
Change 2 . . . . .	15 May 92	Change 17 . . . . .	15 May 96
Change 3 . . . . .	15 Nov 92	Change 18 . . . . .	15 Aug 96
Change 4 . . . . .	15 Feb 93	Change 19 . . . . .	15 Nov 96
Change 5 . . . . .	15 May 93	Change 20 . . . . .	15 Feb 97
Change 6 . . . . .	15 Aug 93	Change 21 . . . . .	15 May 97
Change 7 . . . . .	15 Nov 93	Change 22 . . . . .	15 Aug 97
Change 8 . . . . .	15 Feb 94	Change 23 . . . . .	15 Nov 97
Change 9 . . . . .	15 May 94	Change 24 . . . . .	15 Feb 98
Change 10 . . . . .	15 Aug 94	Change 25 . . . . .	15 Aug 98
Change 11 . . . . .	15 Nov 94	Change 26 . . . . .	15 Nov 98
Change 12 . . . . .	15 Feb 95	Change 27 . . . . .	15 Feb 99
Change 13 . . . . .	15 May 95	Change 28 . . . . .	15 Aug 99
Change 14 . . . . .	15 Aug 95		

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**LIST OF EFFECTIVE FRONT MATTER PAGES**

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**NUMERICAL INDEX OF EFFECTIVE WORK PACKAGES****NOTE**

Only those work packages (WPs) and subordinate work packages (SWPs) assigned to this manual are listed in this index.

Insert Change No. 28 WPs and SWPs, dated 15 August 1999. Dispose of superseded WPs and SWPs. If changed pages are issued to a WP or SWP, insert the changed pages in the applicable WP or SWP. The portion of the text affected in a changed WP or SWP is indicated by change bars in the outer margin of each column of text. Changes to illustrations are indicated by pointing hands or change bars, as applicable. Changes to wiring diagrams are indicated by shaded areas.

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\*Zero in this Column Indicates an Original WP/SWP



**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

This is a list of TCTOs applicable to this manual. TCTOs will also be listed in the work packages to which they apply.

None



## **SAFETY SUMMARY**

### **INTRODUCTION**

This technical order (T.O.) describes physical and chemical processes which may require the use of chemicals, solvents, paints, or other commercially available hazardous material. This T.O. also describes maintenance actions which may require handling or use of potentially dangerous parts or equipment.

Personnel performing maintenance procedures and practices included in this T.O. shall be familiar with safety precautions and procedures associated with chemicals and other hazardous materials, parts and equipment. The user of this T.O. shall consult their local safety and health staff and Material Safety Data Sheet (MSDS) concerning any questions on hazardous chemicals, personal protective equipment requirements, and appropriate handling and emergency procedures. The user shall become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. Disregarding safety precautions and procedures or performing unauthorized maintenance can cause engine or equipment damage, serious injury, illness, or death.

### **WARNING, CAUTION, and NOTE STATEMENTS**

#### **WARNING**

Highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in personal injury, loss of human life, or an acute/chronic health hazard.

#### **CAUTION**

Highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in equipment damage or destruction.

WARNINGS (for personnel protection) or CAUTIONS (for equipment protection) precede selected procedures in this T.O. for additional emphasis. WARNINGS and CAUTIONS are used where emphasis beyond the general safety precautions and instructions are required because the equipment, procedures, or work environment represents an unusual situation (nonroutine use or application) to the technician. The WARNING or CAUTION applies each time the related step is repeated.

#### **NOTES**

A note describes an unusual procedure or condition which special attention must be paid for a particular reason.

Notes are not part of safety. A note does not replace a warning or caution.

**SAFETY SUMMARY (continued)**

**BACKUP WRENCH**

When torquing or breaking torque on any tube coupling nut, use a suitable wrench to apply torque to the fitting to which the part is attached. Failure to properly use a backup wrench can result in failure of tubes and accessories due to stress loading during torquing procedures.

**BEARING HANDLING**

The most common cause of bearing damage is attributed to improper preservation and mishandling. Do not handle bearings with bare hands. Wear approved gloves when handling bearings. Coat bearings with engine oil and store in labeled containers as matched sets. Ensure all bearing components have matching serial numbers before installation to prevent bearing failure due to mismatched contact surfaces.

**BRAZING, SOLDERING, AND WELDING**

Brazing, soldering and welding operations may produce fumes that can be harmful to breathe. Arc welding emits ultraviolet light, which can burn the skin and eyes. Provide adequate ventilation. Wear protective clothing/equipment. Ensure gas bottles are properly secured.

**CABLES, ELECTRICAL**

Small radius bends or severe flexing of electrical cables can result in damage to conductors and/or outer braid.

**CARBON SEALS AND SEAL SEATS**

Carbon seals and carbon seal seats are easily damaged and shall be handled with care. Do not allow carbon seals to come in contact with petroleum based solvents. These solvents will reduce the lubricity of the carbons and result in rapid seal wear. Do not handle carbon seals or seal seats with bare hands. Wear approved, lint free gloves.

**CHEMICAL COMPOUNDS AND SOLUTIONS**

Many of the chemical solutions and their components used in cleaning, inspection, and repair may cause irritation to skin, eyes, and respiratory system. Many of the chemicals, including their vapors, may be poisonous, easily ignited, corrosive, and react violently with incompatible materials. Improper mixing and combining of these chemicals can produce violent reactions, rapid heat generation, and explosive/toxic gases. Heating certain chemicals may cause toxic gases to be produced. Observe manufacturer's warning labels and Material Safety Data Sheet (MSDS) instructions for proper handling, storage, and disposal. Consult the local Safety Office for additional information.

**COMPRESSED AIR**

Compressed air can generate flying debris and can cause severe injury if air blast penetrates the skin or eyes. Reduce compressed air pressure for cleaning or drying to less than 30 psig. Use with effective chip guarding and personal protective equipment. Do not direct air blast toward other personnel.



**SAFETY SUMMARY (continued)****COMPRESSED GASES**

Many compressed gases are highly flammable/explosive and can cause suffocation at varied levels of concentration or exposure time. Some of the gases can freeze body tissue. Keep ignition sources away. Provide adequate ventilation. Wear protective clothing/equipment. Store in properly marked/labeled containers at approved locations. Do not use in confined areas which may create an explosive atmosphere. Refer to specific Material Safety Data Sheet (MSDS) for additional information.

**DANGEROUS PRESSURE**

Pressure system precautions apply to all equipment using gases and fluids at all ranges of pressure. To avoid injury, stand clear of tooling and parts being pressure tested when pressure is being applied. Proper tool installation and hose connections shall be ensured before applying pressure. Ensure all system components are compatible with pressures applied and pressure medium used. Pressure shall be applied slowly.

**ELECTROSTATIC DISCHARGE (ESD)**

Circuit card assemblies and their related components may be damaged by undetectable electrostatic discharge. Care shall be used during handling or repair of these items. Use electrostatic discharge precautionary standard operating procedures.

**ENGINE AND ACCESSORIES - TEMPERATURE**

Aircraft engines and accessories are extremely hot following operation. Allow sufficient time to cool or wear protective clothing/equipment when maintenance or inspection tasks are required following engine operation. Failure to comply may result in injury to personnel.

**ENGINE AND CONTROLS PRESERVATION**

Engines and engine controls shall be drained of all fuel and preserved before shipping. Failure to drain fuel can result in a fire hazard. Engine preservation replaces any fuel with oil, which acts as a corrosion preventing agent.

**FOREIGN OBJECT DAMAGE (FOD)**

Foreign objects can enter engine compartments and accessories during maintenance. Always be aware of the potential for foreign object damage (FOD) entering any uncovered opening of an engine or accessory. Always thoroughly clean parts and compartments to remove all foreign material. Make a final detail inspection of the work area when the job is finished. Follow standard operating procedures for tool and equipment accountability.

**FOOD AND TOBACCO**

Wash hands and face thoroughly prior to smoking tobacco products or eating food. Residue of the materials used in engine and equipment maintenance can cause serious health problems if ingested or inhaled in the smoke.

**HEARING PROTECTION**

The frequency and intensity of noise generated during some operations may cause an acute or chronic hearing impairment. Wear approved hearing protection equipment. Contact the local safety office or bioenvironmental engineering for further guidance.

## **SAFETY SUMMARY (continued)**

### **HYDRAULIC TOOLING**

Application of hydraulic pressure to tooling or engine parts can cause them to jump with enough force to cause personal injury. Excessive pressure applied to tooling by a hydraulic pump can cause a structural failure to the engine part and/or the tooling which could result in personal injury. Using a ram with a nonapproved part number or exceeding hydraulic pump pressure can result in excessive pressure being applied to tooling. Do not exceed ram capacity for a given tool. Stand clear of tooling and engine parts during hydraulic tool operations.

### **JEWELRY**

Remove rings, watches, necklaces, and other metallic objects that may be snagged or cause shock or burn hazards.

### **LEAD SEALS**

Lead seals shall only be removed when specifically called for in the procedure.. Lead seals identify areas of critical adjustment that can only be attained at the Depot or Vendor level.

### **LIFTING, ROTATING, AND SUPPORTING**

Personnel shall stay clear of objects being lifted during hoist operations or when objects are supported by temporary transition supports. To prevent personal injury, use adequate number of personnel and appropriately rated lifting/handling devices to lift or move objects. Unless specified in the procedures, personnel shall not work on objects suspended by a hoist or supported by temporary transition supports. Personnel shall be prepared for potential unbalanced conditions during hoist operations.

### **LIVE ELECTRICAL CIRCUITS**

Do not work on electrical systems, replace components, or make adjustments to equipment with the electrical supply turned on. Under certain conditions, danger may exist even when the power control is in the "off" position due to charges retained by capacitors. To avoid injuries, always remove power from, discharge, and ground a circuit prior to servicing. Adhere to all lock-out/tag-out requirements.

### **MAINTENANCE STANDS AND FIXTURES**

Ensure modules or assemblies are firmly secured to work stands or fixtures before performing maintenance procedures. Personal injury or damage to modules or assemblies may occur if a work stand or fixture slips.

### **METAL MACHINING PROCESSES**

Metal machining processes may generate dust, fumes, filings, and/or shavings which may cause acute/chronic irritation to the skin, eyes, digestive tract, and respiratory system. Metallic dust vapors may form a fire hazard when exposed to heat, flame, or when in contact with oxidizing agents. Prior to performing any metal machining process, personnel shall consult their local safety and health staff and the Material Safety Data Sheet (MSDS) to become familiar with the hazards and protective measures for a specific metal.

**SAFETY SUMMARY (continued)****MOVING ENGINE**

Do not move an engine on work stand rails or transportation trailer without having installed proper supports, tierods, and flange adapters. Engine may shift or fall off rails and cause injury to personnel. When moving engine, do not push on engine. Use the engine support mount assemblies as a push point.

**PACKING LUBRICATION (OIL AND FUEL SYSTEMS)**

Use only the lubricant specified in the technical order to lubricate fuel and oil system packings. Use of an incompatible lubricant can cause oil foaming, clogging of critical fuel system filters, and packing deterioration leading to leakage, possible fire and engine shutdown.

**PROTECTIVE CLOSURES AND COVERS**

Install protective closures on all plumbing and components immediately upon removal. Install protective covers on engine modules, assemblies, parts, and compartments when not being worked.

**QUICK-RELEASE PINS**

Do not force quick release pins into place as this may damage the self-locking feature of the pins. The compatibility of quick release pins is determined by the part number. Intermixing of pin part numbers during installation can result in loss of or failure of the quick release pins.

**SHARP EDGED BLADES**

Many blades have sharp edges. Wear protective gloves when handling bladed rotors and when installing or removing blades from rotors. Blades should only be used in their designed holder or rotor.

**SUPER-CHILLED/HEATED PARTS AND EQUIPMENT**

Super-chilled or heated parts and the equipment or agents used to heat or chill can cause burns, frostbite, or both. Wear temperature resistant gloves and other related protective clothing/equipment when handling chilled or heated parts or equipment. Super-chilled parts are fragile due to a lower resistance to impact. Heating parts beyond specified temperature limits can degrade heat treat qualities and result in part failure.

**TEMPERATURE NORMALIZING**

Allow heated or chilled parts to reach room temperature before applying final torque to fasteners. Failure to comply may result in improperly seated parts and/or mistorqued fasteners.

**WORK BOLTS AND WORK NUTS**

Work bolts and work nuts shall be permanently marked to distinguish them from engine bolts and nuts. Do not apply lubricants to work bolts and work nuts that will be replaced by engine bolts and nuts which require a thread sealant. Sealants will not adhere to threads contaminated with lubricants.



**WORK PACKAGE****ALPHABETICAL INDEX****ON CONDITION MAINTENANCE****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

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Oil Pressure, Zero, Engines Returned to Depot	028 00
On Condition Maintenance	
Concept	002 00
Introduction	002 00
Special Requirements	002 00
Work Package Numbering	002 00

## ALPHABETICAL INDEX (continued)

Subject	WP/No.
<b>P</b>	
Plate, Rotating, Blade, Turbine, Front, First Stage	
Scheduled Maintenance Inspection - - - - -	006 00
Plate Rotating, Blade, Turbine, Second Stage	
Scheduled Maintenance Inspection - - - - -	006 00
Plug, No. 5 Bearing	
Scheduled Maintenance Inspection - - - - -	007 00
Pump Assembly, Main Oil	
Scheduled Maintenance Inspection - - - - -	008 00
Pump Assembly, Scavenge, No. 2 and 3 Bearing, Gearbox	
Scheduled Maintenance Inspection - - - - -	008 00
Pump, Fuel, Augmentor	
Scheduled Maintenance Inspection - - - - -	009 00
Pump, Gear, Main Fuel	
Scheduled Maintenance Inspection - - - - -	009 00
PWA 284 Abradable Upgrade For 7th through 12th Stage Compressor	
Stators With PWA 279 Abradable	
Unscheduled Maintenance - - - - -	036 00
<b>R</b>	
Rear Compressor Drive Turbine	
Scheduled Maintenance - - - - -	006 00
Ring, Air Sealing, No. 4 Bearing Seal, Front	
Scheduled Maintenance Inspection - - - - -	005 00
Ring Assembly, Air Sealing, No. 3 Bearing	
Scheduled Maintenance Inspection - - - - -	005 00
Ring Assembly, Air Sealing, No. 4 Bearing, Rear	
Scheduled Maintenance Inspection - - - - -	005 00
Ring Assembly, Air Sealing, Turbine	
Scheduled Maintenance Inspection - - - - -	005 00
Ring Assembly, Air Sealing, Turbine, Fourth Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Ring Assembly, Air Sealing, Turbine, Second Stage	
Scheduled Maintenance Inspection - - - - -	006 00
Ring Assembly, Air Sealing, Turbine, Third Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Ring, Compressor Blade Lock, Third Stage	
Scheduled Maintenance Inspection - - - - -	004 00
Ring Half Assembly, Synchronizing, Compressor Stator, Fourth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Ring Half Assembly, Synchronizing, Rear Compressor Stator, Fifth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Ring Half Assembly, Synchronizing, Rear Compressor Stator, Inlet	
Scheduled Maintenance Inspection - - - - -	005 00
Ring Half Assembly, Synchronizing, Rear Compressor Stator, Sixth Stage	
Scheduled Maintenance Inspection - - - - -	005 00

## ALPHABETICAL INDEX (continued)

Subject	WP/No.
Ring Segment Assembly, Air Sealing, Turbine, Fourth Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Ring Segment Assembly, Air Sealing, Turbine, Third Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Ring, Synchronizing, Front Compressor, Inlet	
Scheduled Maintenance Inspection - - - - -	004 00

## S

Scheduled Maintenance	
Augmentor Duct and Nozzle Module - - - - -	010 00
Core Engine Module - - - - -	005 00
Definition - - - - -	002 00
Fan Drive Turbine Module - - - - -	007 00
Inlet Fan Module - - - - -	004 00
Presentation - - - - -	002 00
Rear Compressor Drive Turbine - - - - -	006 00
Scoop Assembly, No. 2 Bearing, Front	
Scheduled Maintenance Inspection - - - - -	005 00
Scoop, No. 2 Bearing, Rear	
Scheduled Maintenance Inspection - - - - -	005 00
Scoop, No. 4 Bearing	
Scheduled Maintenance Inspection - - - - -	005 00
Seal, Air, Compressor, Front, Second Stage	
Scheduled Maintenance Inspection - - - - -	004 00
Seal, Air, Compressor, Rear, First Stage	
Scheduled Maintenance Inspection - - - - -	004 00
Seal, Air, Front Compressor Inlet	
Scheduled Maintenance Inspection - - - - -	004 00
Seal, Air, Compressor, Front, First Stage	
Scheduled Maintenance Inspection - - - - -	004 00
Seal, Air, Fan, First Stage	
Scheduled Maintenance Inspection - - - - -	004 00
Seal, Air, Fan, Second Stage	
Scheduled Maintenance Inspection - - - - -	004 00
Seal, Air, Fan, Third Stage	
Scheduled Maintenance Inspection - - - - -	004 00
Seal, Air, No. 4 Bearing	
Scheduled Maintenance Inspection - - - - -	005 00
Seal, Air, Turbine, First Stage	
Scheduled Maintenance Inspection - - - - -	006 00
Seal, Air, Turbine, Fourth Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Seal, Air, Turbine, Third Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Seal Assembly, Face, Deaerator Driveshaft	
Scheduled Maintenance Inspection - - - - -	008 00

## ALPHABETICAL INDEX (continued)

Subject	WP/No.
Seal Assembly, Face, No. 1 Bearing Scheduled Maintenance Inspection - - - - -	004 00
Seal Assembly, Face, No. 2 Bearing Scheduled Maintenance Inspection - - - - -	005 00
Seal Assembly, Face, No. 3 Bearing Scheduled Maintenance Inspection - - - - -	005 00
Seal Assembly, Face, No. 3 Bearing, Rear Scheduled Maintenance Inspection - - - - -	005 00
Seal Assembly, Face, No. 5 Bearing Scheduled Maintenance Inspection - - - - -	007 00
Seal Assembly, Face, PTO Driveshaft Scheduled Maintenance Inspection - - - - -	008 00
Seal Assembly, No. 4 Bearing, Front Scheduled Maintenance Inspection - - - - -	005 00
Seal Assembly, No. 5 Bearing Scheduled Maintenance Inspection - - - - -	007 00
Seal, Face Scheduled Maintenance Inspection - - - - -	008 00
Seat Assembly, No. 3 Bearing Seal, Front Scheduled Maintenance Inspection - - - - -	005 00
Seat Assembly, No. 3 Bearing Seal, Rear Scheduled Maintenance Inspection - - - - -	005 00
Seat Assembly, No. 4 Bearing Seal, Front Scheduled Maintenance Inspection - - - - -	005 00
Seat Assembly, No. 4 Bearing Seal, Rear Scheduled Maintenance Inspection - - - - -	005 00
Seat, Ball Socket, No. 5 Bearing Support Scheduled Maintenance Inspection - - - - -	007 00
Seat, No. 1 Bearing Scheduled Maintenance Inspection - - - - -	004 00
Seat, No. 2 Bearing Seal, Front Scheduled Maintenance Inspection - - - - -	005 00
Seat, No. 2 Bearing Seal, Rear Scheduled Maintenance Inspection - - - - -	005 00
Seat, No. 5 Bearing Seal Scheduled Maintenance Inspection - - - - -	007 00
Shaft Assembly, Front Compressor Drive, Turbine Scheduled Maintenance Inspection - - - - -	007 00
Shaft, Gearbox Deaerator Impeller Scheduled Maintenance Inspection - - - - -	008 00

## ALPHABETICAL INDEX (continued)

Subject	WP/No.
Shield, Heat, Front Compressor Drive Shaft, Turbine	
Scheduled Maintenance Inspection - - - - -	007 00
Shroud, Front Compressor Stator, Inlet	
Scheduled Maintenance Inspection - - - - -	004 00
Shroud Segment Set, Compressor Stator, Fifth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Shroud, Segment Set, Compressor Stator, Fourth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Shroud Segment Set, Compressor Stator, Sixth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Shroud, Rear Compressor Stator, Inlet	
Scheduled Maintenance Inspection - - - - -	005 00
Sleeve, Gearbox Drive Gearshaft	
Scheduled Maintenance Inspection - - - - -	005 00
Sleeve, Sealing, Gearbox	
Scheduled Maintenance Inspection - - - - -	008 00
Stalls, Core Engine Module Maintenance After Rejection For	
Unscheduled Maintenance Inspection - - - - -	035 00
Stator, Generator	
Scheduled Maintenance Inspection - - - - -	009 00
Strap Assembly, Bleed Valve	
Scheduled Maintenance Inspection - - - - -	005 00
Support Assembly, No. 2 and 3 Bearing Seal	
Scheduled Maintenance Inspection - - - - -	005 00
Support Assembly, No. 3 Bearing	
Scheduled Maintenance Inspection - - - - -	005 00
Support Assembly, No. 3 Bearing Seal	
Scheduled Maintenance Inspection - - - - -	005 00
Support Assembly, No. 5 Bearing, Inner	
Scheduled Maintenance Inspection - - - - -	007 00
Support Assembly, Turbine Stator, First Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Support, Front Compressor Stator Bellcrank, Inlet	
Scheduled Maintenance Inspection - - - - -	004 00
Support, No. 5 Bearing Seal	
Scheduled Maintenance Inspection - - - - -	007 00
Support, Turbine, Duct and Vane	
Scheduled Maintenance Inspection - - - - -	006 00

## T

Tube Assembly, Air Supply, No. 4 Bearing Seal	
Scheduled Maintenance Inspection - - - - -	005 00
Tube Assembly, Pressure, No. 4 Bearing, Internal	
Scheduled Maintenance Inspection - - - - -	005 00
Tube Assembly, Scavenge, No. 4 Bearing, Internal	
Scheduled Maintenance Inspection - - - - -	005 00
Turbine Distress	
Bore Fire - - - - -	027 00

## ALPHABETICAL INDEX (continued)

Subject	WP/No.
<b>U</b>	
Unscheduled Maintenance	
Definition - - - - -	002 00
General Instructions - - - - -	021 00
Introduction - - - - -	020 00
Presentation - - - - -	002 00
<b>V</b>	
Vane Assembly, Turbine Stator, First Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Vane, Compressor Stator, Fifth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Vane, Compressor Stator, Fourth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Vane, Compressor Stator, Sixth Stage	
Scheduled Maintenance Inspection - - - - -	005 00
Vane, Front Compressor Stator, Inlet	
Scheduled Maintenance Inspection - - - - -	004 00
Vane, Rear Compressor, Stator, Variable Inlet	
Scheduled Maintenance Inspection - - - - -	005 00
Vane, Turbine Stator, Fourth Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Vane, Turbine Stator, Second Stage	
Scheduled Maintenance Inspection - - - - -	006 00
Vane, Turbine Stator, Third Stage	
Scheduled Maintenance Inspection - - - - -	007 00
Valve, Anti-icing, Engine Inlet	
Scheduled Maintenance Inspection - - - - -	009 00
Valve Assembly, Breather Pressurizing	
Scheduled Maintenance Inspection - - - - -	008 00
Vibration-Engine, Excessive, Due to Severe Module Distress	
Unscheduled Maintenance Inspection - - - - -	037 00
Volcanic Ash Ingestion	
Unscheduled Maintenance Inspection - - - - -	034 00



**WORK PACKAGE****INTRODUCTION****ON CONDITION MAINTENANCE****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 8

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
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## 1. INTRODUCTION.

- a. This manual provides the following:
  - Inspection and maintenance procedures based on the On Condition Maintenance (OCM) concept
  - Other related special requirements

## 2. ON CONDITION MAINTENANCE CONCEPT.

(See Table 1.)

- a. On Condition Maintenance (OCM) is the application of inspection and testing procedures that allow the condition of equipment to dictate maintenance needs or repairs required to restore serviceability.
- b. Borescope inspection, chip detector examination, joint oil analysis procedure (JOAP) evaluation, engine diagnostic unit readings, and component flags are all used to determine the condition of the module. The OCM team, engineering/equipment specialists, production, quality, scheduling and planning personnel at depot, use these inspections, as well as review of module records, to determine and prescribe the repair required.
- c. In this manual, OCM is divided into two categories of maintenance: scheduled and unscheduled.
  - (1) Scheduled Maintenance.

- (a) Data collected through analytical condition inspection (ACI) and experience gained during maintenance has led to the development of scheduled maintenance inspection requirements to maintain engine reliability. In addition, cycle limitations on various module parts dictate that modules be returned to depot at specific total equivalent cycles (TEC) for parts replacement. (Refer to paragraph 3 for an explanation of TEC.) The various scheduled cycle inspections outlined in the scheduled maintenance inspection work packages have been designed to coincide with replacement of TEC limited items. At this time, overhaul of TEC controlled modules is not required.
- (b) Under the OCM concept, all parts removed from a module shall be visually inspected for serviceability. Parts not listed in the scheduled maintenance inspection table shall be visually inspected for serviceability. If wear or damage is evident, additional inspections shall be accomplished as required.

(2) Unscheduled Maintenance addresses the entire engine or module. Unscheduled maintenance is required when an engine or module has been removed for operational problems or for failure to pass intermediate maintenance scheduled inspection. It provides troubleshooting guidance and the required maintenance to correct the problem with minimum amount of disassembly or repair.

d. The two categories of maintenance (scheduled and unscheduled) are interrelated. When an engine is received for malfunction, scheduled maintenance and unscheduled maintenance may be performed at the same time. Three conditions exist that will dictate action to be taken:

	Condition	Action
1.	Module reaches scheduled time without any problems.	Perform all maintenance described for that time in Scheduled Maintenance Inspection.
2.	Module is in shop with a problem but has more time/cycles remaining for module as listed in Table 1 until next scheduled inspection.	Perform all maintenance described in Unscheduled Maintenance.
3.	Module is in shop and has less time/cycles remaining for module as listed in Table 1 until next scheduled inspection.	Perform all maintenance described for that time in Scheduled Maintenance. Inspect and perform any required Unscheduled Maintenance.

**Table 1. Module Time/Cycles**

Module	Time(EOT)/Cycles(TAC) Remaining Until Next Scheduled Inspection
Fan	800 TAC
Core	800 TAC
High Pressure Turbine	800 TAC
Low Pressure Turbine	800 TAC
Augmentor	400 TAC
Gearbox	600 EOT(MOH)

### 3. TOTAL ACCUMULATED CYCLE - EXPLANATION.

a. General. Total accumulated cycles (TAC) are calculated from a mathematical formula which uses low cycle fatigue (LCF) cycle counts obtained from the engine diagnostic unit (EDU). Specific definitions of LCF cycles, the formula used to calculate TAC, and a typical example of the calculation are presented in the following steps.

b. Definitions:

(1) EDU recorded Type I manual cycles (MAN).

(a) A LCF manual cycle is any engine run involving a start and at least one excursion to Intermediate power or above. An engine start followed by several excursions to Intermediate power is still counted as only one manual cycle, while an engine start followed by idle power operation only, is not a manual cycle.

(2) EDU recorded Type III cycles (LCF).

(a) The EDU records a LCF Type III cycle count when the engine N1 is increased from idle rpm to MIL rpm then decreased

to idle rpm. A Type III is recorded for each excursion of this type.

(3) EDU recorded Type IV cycles (CY4).

(a) The EDU records a LCF Type IV cycle count when the engine N1 is increased from cruise rpm to MIL rpm and then decreased to cruise rpm. A Type IV is recorded for each excursion of this type.

c. Formula used to calculate TAC:

$$\text{TAC} = \text{MAN} + \text{K3} (\text{LCF} - \text{MAN}) + \text{K4} (\text{CY4} - \text{LCF})$$

where:

K1	=	1.00
K3	=	0.250
K4	=	0.025

d. Example of calculation:

For a fan drum rotor

MAN	=	400 cycles
LCF	=	800 cycles
CY4	=	1000 cycles

$$\begin{aligned} \text{TAC} &= 400 + 0.250 (800 - 400) \\ &\quad + 0.0250 (1000 - 800) \\ &= 505 \text{ TAC} \end{aligned}$$

This means that this part has accumulated 505 TAC of its 8000 TAC life limit.

#### 4. CONTENTS, ARRANGEMENT, AND NUMBERING OF WORK PACKAGES IN THIS MANUAL.

- a. This manual contains work packages arranged in separate groups. A block of five digit numbers has been assigned for each group. The numbers within

each block identify work packages. The first work package in each block is an introductory work package and provides a listing of all the work packages within each block. The blocks of numbers and corresponding groups are:

WP Block Numbers	Functional Groups
001 00	Alphabetical Index
002 00	Introduction
003 00 through 019 00	Scheduled Maintenance
020 00 through 099 00	Unscheduled Maintenance

#### 5. CHANGE REQUEST.

- a. Recommendations for specific changes to this technical order shall be submitted on an AFTO Form 22 to SA-ALC/LPCQ(TOMA), Kelly AFB, TX 78241-6421 in accordance with T.O. 00-5-1.

## 6. SCHEDULED MAINTENANCE PRESENTATION.

(See Figure 1.)

- a. Figure 1 shows an example of how scheduled maintenance is presented in this manual. The information is presented as follows:

### NOTE

The applicable technical order and work package where corrective action can be found will be supplied in subsequent changes to this manual.

- (1) A scheduled maintenance inspection table providing module inspection requirements for an increasing number of cycle intervals, notes explaining part numbers, additional inspections, replacement and reoperation information, etc and applicable technical order and work package where corrective action can be found.

- (2) A pictorial layout showing all the parts addressed in the scheduled maintenance inspection table.

## 7. UNSCHEDULED MAINTENANCE PRESENTATION.

- a. The presentation of Unscheduled Maintenance inspections and maintenance procedures will be primarily in tabular form.
- b. The basic function of tabularized unscheduled maintenance procedures is to guide technicians to the correct area and procedures in a minimal amount of time.
- c. The tables appear as follows:

Engine/Module	Area/Task	T.O./WP Reference	Remarks
1. Engine	a. Remove Inlet fan module.	a. T.O. 2J-F100-53-5, WPs 133 00 through 136 00	

- (1) The first column isolates major engine components.
- (2) The second column pinpoints component and the work to be done.

- (3) The third column provides the references to manual work packages needed to complete the work required.

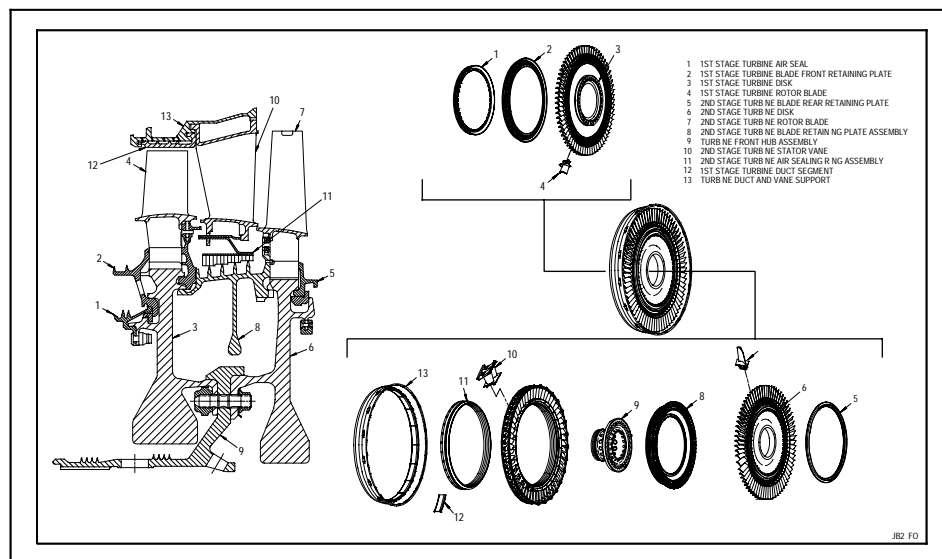
TABLE 1. REAR COMPRESSOR DRIVE TURBINE MODULE-  
SCHEDULED MAINTENANCE INSPECTION

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	2150 CYCLES INSPECTION	T.O.2J-F100-53-8 WORK PACKAGE REFERENCE
1	Seal, Air, Turbine, 1st Stage	4069990	VIS, DIM, FPI, ECI	301 00
2	Plate, Retaining, Blade, Turbine Front, 1st Stage	4069949	VIS, FPI, ECI	302 00
3	Disk Turbine, 1st Stage	4069901	VIS, DIM, FPI, ECI	304 00
4	Blade, Turbine Rotor, 1st Stage	4070801	VIS, DIM, FPI	303 00
5	Plate, Retaining, Blade, Turbine, 2nd Stage	4061632	VIS, FPI	312 00
10	Vane, Turbine Stator, 2nd Stage	4072682	VIS, FPI	307 00
11	Ring Assembly, Air Sealing, Turbine, 2nd Stage	4075551-01	VIS, FPI	307 00
12	Duct Segment, Turbine, 1st Stage	4076206	VIS, FPI	306 00
13	Support, Turbine, Duct and Vane	4076291	VIS, VPI	306 00

ACTION CODES

DIM - Dimensionally inspect  
ECI - Eddy current inspect  
MPI - Magnetic particle inspect  
VIS - Visually inspect

## SCHEDULED MAINTENANCE INSPECTION TABLE



PICTORIAL LAYOUT PROVIDES INDEX NUMBERS CODED TO THE  
SCHEDULED MAINTENANCE INSPECTIONS

JB5X1 (48X2)

Figure 1. Scheduled Maintenance Presentation





## WORK PACKAGE

### INTRODUCTION

### SCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

### LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

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1. INTRODUCTION.

- a. This work package introduces the 003 00 through 019 00 series of work packages for scheduled maintenance. The following work packages are included in this series:

WP/SWP No.	Title
004 00	Inlet/Fan Module - Scheduled Maintenance
005 00	Core Engine Module - Scheduled Maintenance
006 00	Rear Compressor Drive Turbine - Scheduled Maintenance
007 00	Fan Drive Turbine Module - Scheduled Maintenance
008 00	Gearbox Module - Scheduled Maintenance
009 00	Engine Controls - Scheduled Maintenance
010 00	Augmentor Duct and Nozzle Module - Scheduled Maintenance
011 00	Open
through	
019 00	

## WORK PACKAGE

## TECHNICAL PROCEDURES

## INLET/FAN MODULE - SCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

## LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

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REFERENCE MATERIAL REQUIRED

Title	Number
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package provides scheduled maintenance requirements for the inlet/fan module.

**2. INLET/FAN MODULE SCHEDULED MAINTENANCE.**

(See FO-1 and Table 1.)

- a. See FO-1 and table 1 for inlet/fan module scheduled maintenance.

**Table 1. Inlet/Fan Module Scheduled Maintenance Inspection**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLES INSPECTION	T.O. 2J-F100-53-6 WORK PACKAGE AND OTHER REFERENCES
1	Bearing Assembly, Roller, No. 1	4018466 4018467 4060870 4061549	VIS, DIM	304 00
2	Seat, No. 1 Bearing	4075499	VIS, MPI, DIM	305 00
3	Seal Assembly, Face No. 1 Bearing	4054085-01	VIS, DIM	307 00
3A	Seal Ring, No. 1 Bearing, metal	4054080	VIS, DIM, FPI	329 00
4	Housing Assembly, No. 1 Bearing	4075229 4075139 4074825	VIS, FPI, DIM	307 00
5	Shroud, Front Compressor Stator Inlet	4059690	VIS, FPI, DIM, and Note 1.	311 00
		Note 1. Replace air seal rubber. Refer to T.O. 2J-F100-53-6, WP 416 00.		
6	Bearing, Compressor Stator, Inlet	4065513 4071318	VIS, DIM	312 00
7	Seal, Air, Front Compressor, Inlet	4071080	VIS, FPI	313 00
8	Seal, Air, Compressor, Front, 1st Stage	4071081	VIS, FPI	319 00
9	Seal, Air, Compressor, Rear, 1st Stage	4071082	VIS, FPI	314 00
10	Blade Assy, Compressor Rotor 2nd Stage	4066172 4076782	VIS, FPI and Note 1	315 00
			Note 1. Strip and recoat with copper nickel and antigalling compound. Refer to T.O. 2J-F100-53-6, WP 415 00. Send blades to repair vendor.	
11	Seal, Air, Compressor, Front, 2nd Stage	4071083	RN - Use PN 4083150. PN 4071083 shall be scrapped.	Not applicable
		4083150	VIS, DIM, FPI	320 00

Table 1. Inlet/Fan Module Scheduled Maintenance Inspection (continued)

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLES INSPECTION	T.O. 2J-F100-53-6 WORK PACKAGE REFERENCE
12	Disk Assembly, Drum Rotor, Front Compressor	4071223-01 4081633-01 4086294 4086295	VIS, DIM, FPI, ECI, SP, RW, and Notes 1 through 4 or RN	322 00
			Note 1. Remove copper nickel deposits from blade slots per WP 201 00 prior to inspecting blade slots for galling. Note 2. Reapply PWA 36545 antigalling compound per WP 422 00. Note 3. Blade slots shall be shotpeened each return of inlet/fan module to depot. Galling or fretting of 0.003 inch maximum serviceability is to be repaired by shotpeen per WP 422 00. Note 4. Third stage rotor disk shall be removed and replaced. Refer to T.O. 2J-F100-56-6. Applies to PN 4071223-01 and PN 4081633-01. PN 4086294 and PN 4086295 shall be scrapped.	
13	Ring, Compressor Blade Lock, 3rd Stage	4071224	RN and Note 1.	321 00
		4080320	VIS, FPI	321 00
			Note 1. Replace PN 4071224 with PN 4080320. Refer to T.O. 2J-F100-229(I)-501.	
14	Blade, Compressor Rotor, 3rd Stage	4067003	RN - PN 4067003 shall be scrapped.	
15	Case Assembly, Fan	4072388 4079297 4079430 4080063 4080064	VIS, FPI	324 00
15A	Bracket Assembly, Connecting Link	4069487 4069488	VIS, FPI	333 00
16	Seal, Air, Fan, 3rd Stage	4075237	VIS, FPI, RW, and Note 1	316 00, 416 00
			Note 1. Replace air seal rubber per WP 416 00.	
17	Compressor Stator Assembly, 2nd Stage	4074822	RN - PN 4074822 shall be scrapped.	
18	Seal, Air, Fan, 2nd Stage	4075236	VIS, FPI, RW, and Note 1	316 00, 416 00
			Note 1. Replace air seal rubber per WP 416 00.	
18A	Lock, Compressor Stator, 2nd Stage	4074739	VIS, FPI	317 00
19	Compressor Stator Assembly, 1st Stage	4074821	VIS, FPI, and Note 1	318 00, 418 00
			Note 1. Replace air seal rubber per WP 418 00.	

Table 1. Inlet/Fan Module Scheduled Maintenance Inspection (continued)

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLES INSPECTION	T.O. 2J-F100-53-6 WORK PACKAGE REFERENCE
20	Seal, Air, Fan, 1st Stage	4075235 4081566	VIS, FPI, RW, and Note 1.	316 00, 416 00
			Note 1. Replace air seal rubber per WP 416 00.	
20A	Lock, Compressor Stator, 1st Stage	4074738	VIS, FPI	317 00
21	Blade Assy, Compressor Rotor, 1st Stage	4066171 4076781	VIS, FPI and Note 1	315 00
			Note 1. Strip and recoat with copper nickel and antigalling compound per WP 415 00. Send blade to repair vendor.	
22	Support, Front Compressor Stator Bellcrank, Inlet	4074199	VIS, FPI	325 00
23	Bellcrank Assembly, Front Compressor Stator Linkage, Inlet	4065917	VIS, DIM, FPI, RW, and Note 1.	327 00
		4081404	VIS, DIM, FPI, and Note 1.	327 00
			Note 1. Rework PN 4065917 and PN 4081404 to PN 4084170. Refer to T.O. 2J-F100229(I)-508.	
		4084170	VIS, FPI, DIM	327 00
23A	Clevis, Rod End (Left and Right Side)	4075565 4075566	RN - Use PN 4083038 or PN 4083039	
		4083038 4083039	VIS, FPI	328 00
23B	Support Assembly, Variable Vane, Compressor Inlet	4069491 4069492 4069476 4071615	VIS, FPI	331 00
24	Ring, Assembly, Synchronizing, Front Compressor, Inlet	4072235	VIS, FPI	308 00
24A	Bracket, Upper Front, Engine Diagnostic Unit	4069483	VIS, FPI	323 00
24B	Bracket, Lower Front, Engine Diagnostic Unit	4069482	VIS, FPI	323 00
25	Bearing, Compressor Stator, Inlet	4065512 4071319 4080905 4080906	VIS, DIM	312 00
26	Vane, Front Compressor Stator, Variable, Inlet	4071850 4074150	VIS, FPI	312 00

Table 1. Inlet/Fan Module Scheduled Maintenance Inspection (continued)

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLES INSPECTION	T.O. 2J-F100-53-6 WORK PACKAGE REFERENCE
27	Case Assembly, Fan Inlet	4073196-01 4078176-01 4079145-01 4078276-01 4080929-01	VIS, FPI, RW and Note 1.	310 00
		4081494-01 4081560-01 4081561-01 4081562-01 4081563-01	VIS, FPI, RN and Note 2.	310 00
		4082257-01 4082258-01 4082259-01 4082260-01 4082261-01	VIS, FPI	310 00
			Note 1. Rework PN 4073196-01, PN 4078176-01, PN 4079145-01, PN 4078276-01, and PN 4080929-01 to PN 4081494-01, PN 4081560-01, PN 4081561-01, PN 4081562-01, and PN 4081563-01. Refer to T.O. 2J-F100229(I)-504. Note 2. Replace PN 4081494-01, PN 4081560-01, PN 4081561-01, PN 4081562-01, and PN 4081563-01 with PN 4082257-01, PN 4082258-01, PN 4082259-01, PN 4082260-01, and PN 4082261-01. Refer to T.O. 2J-F100229(I)-506.	
28	Connecting Link, Rigid, Front Compressor Stator	4026736	VIS, FPI	326 00
29	Lever Arm Assembly, Compressor Stator Linkage	4065913	VIS, DIM, FPI	309 00
30	Cable, Special, PS2, Heater	4072341	VIS	310 00
31	Cable, Special, Quad N1 Sensing	4072338	VIS	310 00
32	Bellcrank Bushing	4081399	RN - Use PN 4084169	Refer to T.O. 2J-F100-56-6, WP 427 00
		4084169		

## ACTION CODES

DIM - Dimensional inspection

ECI - Eddy current inspection

FPI - Fluorescent penetrant inspection

MPI Magnetic particle inspection

NA - Not applicable (Part number cannot be used at this rebuild interval)

RN - Replace with new design

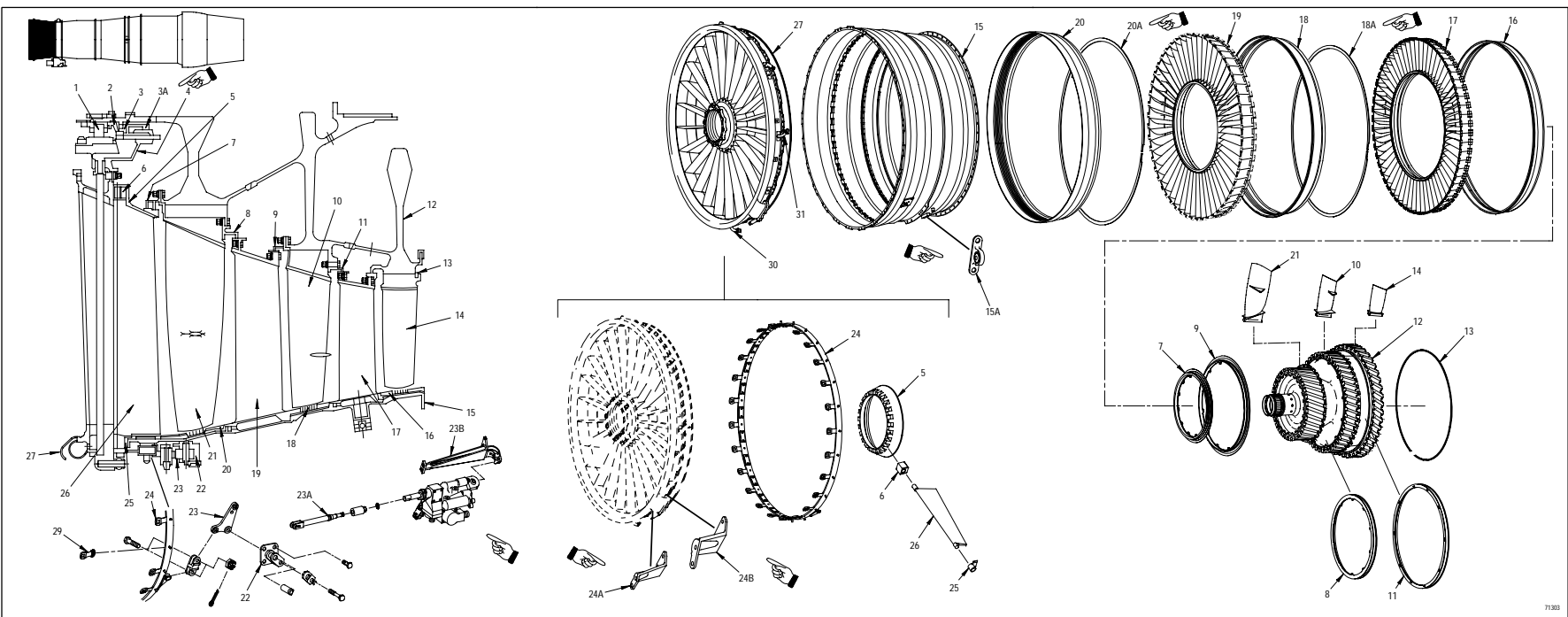
RW - Rework

SP - Shotpeen

VIS - Visual inspection



71303



FO-1. Inlet/Fan Module - Scheduled Maintenance



**WORK PACKAGE****TECHNICAL PROCEDURES****CORE ENGINE MODULE -****SCHEDULED MAINTENANCE****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 30

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
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REFERENCE MATERIAL REQUIRED

Title	Number
Core Engine Module - - - - -	T.O. 2J-F100-53-7

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package provides scheduled maintenance instructions for the core engine module.

**2. CORE ENGINE MODULE SCHEDULED MAINTENANCE.**

(See FO-1 and Table 1.)

- a. See FO-1 and table 1 for core engine module scheduled maintenance.

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
1	Seal Assembly, Face, No. 2 Bearing, Front	4072837 4072839	VIS, DIM	317 00
2	Housing Assembly, No. 2 Bearing	4038606	VIS, FPI, DIM	315 00
3	Support Assembly, No. 2 and 3 Bearing, Seal	4060815 4059492	VIS	316 00
4	Seal Assembly, Face, No. 3 Bearing, Front	4012501 4012468	VIS, DIM	318 00
4A	Seal Assembly, Face, No. 2 Bearing, Rear	4033283 4033284	VIS, DIM	317 00
5	Seal Assembly, No. 2 and No. 3 Bearing	4060816	VIS, DIM	316 00
6	Deleted			
7	Coupling, Turbine Shaft	4071085	VIS, DIM, FPI	312 00
8	Seat, No. 2 Bearing Seal, Front	4001528	VIS, DIM, MPI	306 00
9	Scoop Assembly, No. 2 Bearing, Front	4001799	VIS, DIM, MPI	313 00
10	Scoop, No. 2 Bearing, Rear	4001857	VIS, MPI	314 00
11	Bearing, Ball, Annular, Flanged, No. 2	4075346 4075347 4075348 4081020 4081023	VIS, DIM	339 00
12	Seat, No. 2 Bearing Seal, Rear	4001529	VIS, DIM, MPI	306 00
12A	Nut, No. 2 Bearing ID Retaining	4010237	VIS, MPI	303 00
12B	Support, No. 2 Bearing	4072841	VIS, FPI	309 00
12C	Compressor Stator Assembly, 3rd Stage	4075983 4077688	VIS, FPI	321 00
12D	Shroud, Compressor Stator, 3rd Stage	4071453	VIS, FPI	330 00
13	Housing, Gearbox Drive Bearing	4028827	VIS, FPI, DIM	310 00
14	Bearing, Ball, Annular	4000609 4000610 4056149 4061870	VIS, DIM	339 00
15	Sleeve, Gearbox Drive Gearshaft	4025446	VIS, DIM	345 00
16	Coupling, Gearbox Driveshaft	4025445	VIS, DIM	344 00

Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
17	Bearing, Roller	4000606 4057330 4057425	VIS, DIM	339 00
18	Gearshaft Bevel, Gearbox Drive, 38 Teeth	4068119	VIS, DIM, MPI	311 00
18A	Nut, No. 3 Bearing Retaining	4001860	VIS, MPI	303 00
18B	Gearshaft, Bearing Gearbox Drive (73 teeth)	4069346	VIS, MPI, DIM	311 00
19	Seat Assembly No. 3 Bearing Seal, Front	4022669	VIS, DIM, MPI	306 00
20	Support Assembly, No. 3 Bearing	4075136	VIS, DIM	323 00
21	Bearing, Ball, Flanged, No. 3	4075315 4075317 4075319	VIS, DIM	339 00
22	Seat Assembly, No. 3 Bearing Seal, Rear	4022668	VIS, DIM, MPI	306 00
23	Case Assembly, Compressor, Intermediate	4078245 4078248 4079419 4080483 4080829 4080877 4080879 4080882	VIS, FPI, DIM	369 00
24	Shroud Set, Rear Compressor Stator Inlet	4076790-01	VIS, FPI, DIM	331 00
25	Stator, Fan Exit	4070947	VIS, FPI	348 00
25A	Compressor Case Assembly, 4th Stage	4075420 4079279	VIS, FPI	364 00
26	Ring Half Assembly, Synchronizing, Rear Compressor Stator, Inlet	4075697 4075696	VIS, FPI, DIM	335 00
27	Strap Assembly, Bleed Valve	4069280	VIS, FPI	349 00
28	Bearing, Compressor Stator, Inlet	4066810 4066811 4066812 4077084 4079534	VIS	376 00
29	Vane, Rear Compressor Stator, Variable Inlet	4077250	VIS, FPI, DIM	357 00
30	Bearing, Compressor Stator Inlet	4076814 4076815 4076816	VIS	356 00
31	Seal Assembly, Face, No. 3 Bearing, Rear	4036993 4036994	VIS, DIM	319 00

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
32	Support Assembly, No. 3 Bearing Seal	4076389	VIS, DIM, FPI, RN, and Note 1	307 00
		4068182 4080874	VIS, DIM, and FPI Note 1: Replace PN 4076389 with PN 4068182 or PN 4080874 per T.O. 2J-F100229(II)-536.	
32A	Baffle, No. 3 Bearing	4075540	VIS	324 00
32B	Shield, No. 3 Bearing	4075539	RN and Note 1	362 00
		4082826	VIS and FPI Note 1: Replace PN 4075539 with PN 4082826 per T.O. 2J-F100229(II)-535.	
33	Tierod, Rear Compressor	4074004	VIS, DIM, and FPI	371 00
34	Blade, Compressor Rotor, 4th Stage	4075104-02	RN and Note 1	374 00, 374 01
		4079404	RW to PN 4084124	
		4081604	RW to PN 4084124 Note 1: Replace PN 4075104-02 with PN 4084124.	
35	Blade, Compressor Rotor, 5th Stage	4075105-02	RN and Note 1	374 00, 374 01
		4079405	RW to PN 4084125	
		4081605	RW to PN 4084125 Note 1: Replace PN 4075105-02 with PN 4084125	
36	Disk Assembly, Drum Rotor, Rear Compressor, Front	4074700-01	VIS, DIM, FPI, ECI, RW and Note 1	302 00
		4079858-01 4080396-01	VIS, DIM, FPI, and ECI	
		4080408-01	VIS, DIM, FPI, and ECI Note 1: Rework PN 4074700-01 to PN 4080408-01 per T.O. 2J-F100229(II)-505.	
36A	Air Seal, No. 3 Bearing	4076390	VIS, FPI, DIM, RN, and Note 1	336 00
		4080811	VIS, FPI, and DIM Note 1: Replace PN 4076390 with PN 4080811 per T.O. 2J-F100229(II)-536.	

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
37	Blade, Compressor Rotor, 6th Stage	4075506-02	RN and Note 1	374 00, 374 01
		4079406 4081506	RW to PN 4084106	
			Note 1: Replace PN 4075506-02 with PN 4084106	
38	Disk and Hub Assembly, Compressor, 6th Stage	4070846	VIS, DIM, FPI, ECI	305 00
39	Case Set, Compressor, 4th through 9th Stage	4077081 4079595 4079598 4080084 4080302 All dash numbers	VIS, FPI, DIM, and Note 1  Note 1: Replace antigalling compound (PWA-36545-3) on compressor case. Refer to T.O. 2J-F100-53-7, WP 451 00.	351 00
40	Vane, Compressor Stator, 4th Stage	4075854 4075984	VIS, FPI, DIM	375 00
41	Vane, Compressor Stator, 5th Stage	4075855 4075985 4076395	DIM, VIS, FPI, RN, RW, Notes 1 and 2	375 00
		4080335 4080355	DIM, VIS, FPI  Note 1: Replace PN 4075855, 4075985, or 4076395 with PN 4080335 or PN 4080355 per T.O. 2J-F100229(II)-509	375 00
			Note 2: Rework PN 4075985 to PN 4080355 and rework PN 4075855 to PN 4080355 per T.O. 2J-F100229(II)-510.	



**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
42	Vane Compressor Stator, 6th Stage	4076056 4076156 4076396 4079356 4079456 4079556	VIS, FPI, DIM, RN, RW, and Notes 1 and 2	375 00
		4080156 4080256	VIS, FPI, DIM	375 00
			Note 1: Replace PN 4076056, 4076156, 4076396, 4079356, 4079456, or 4079556 with PN 4080156 or 4080256 per T.O. 2J-F100229(II)-509.	
			Note 2: Rework PN 4076056, 4076156, 4076396, 4079356, 4079456, or 4079556 with PN 4080156 or 4080256 per T.O. 2J-F100229(II)-510.	
43	Shroud Segment Set, Compressor Stator, 4th Stage	4077434-01 4077434-02	DIM, VIS, FPI	365 00
43A	Ring Segment Assembly, Compressor Stator Lock, 4th Stage	4077433-01	VIS, FPI	366 00




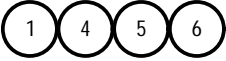
**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
44	Shroud Segment Set, Compressor Stator, 5th Stage	4076475-01 4076475-02	VIS and FPI	365 00
44A	Ring Segment Assembly, Compressor Stator Lock, 5th Stage	4077011-01	RP - New honeycomb required	366 00
45	Shroud Segment Set, Compressor Stator, 6th Stage	4076826-01 4076826-02	VIS, FPI, and DIM	365 00
45A	Ring Segment Assembly, Compressor Stator Lock, 6th Stage	4077012-01	RP - New honeycomb required	366 00
46	Ring Half Assembly, Synchronizing, Compressor Stator, 4th Stage	4075699 4075698	VIS, FPI, and DIM	335 00
47	Ring Half Assembly, Synchronizing, Compressor Stator, 5th Stage	4075669, 4075668	VIS, FPI, DIM, RN, RW, and Notes 1 and Note 2  Note 1: Replace PN 4076669 and PN 4075668 with PN 4077392 and 4077393 per T.O. 2J-F100229(II)-509. Note 2: Rework PN 4075668 to PN 4077392 and PN 4075669 to PN 4077393 per T.O. 2J-F100229(II)-510.	335 00
		4077392 4077393	VIS, FPI, and DIM	335 00
48	Ring Half Assembly, Synchronizing, Compressor Stator, 6th Stage	4075670, 4075671	VIS, FPI, DIM, and Note 1  Note 1: Part is not used after T.O. 2J-F100229(II)-509.	335 00
49	Bearing, Compressor Stator, 4th Stage	4071288 4071287 4071286 4077085 4079535	VIS, DIM, RN, and Note 1  Note 1: Replace 4071288 , 4071287, 4071286 , 4077085, or 4079535 with PN 4081053-01 per T.O. 2J-F100229(II)-519.	376 00
		4081053-01	VIS and DIM	376 00


Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
50	Bearing, Compressor Stator, 5th Stage	4074429	VIS, DIM, RN, and Note 1	376 00
		4074430	Note 1: Replace PN 4074429, 4074430, 4074431 , 4077086 , and 4079536 with PN 4081054-01 per T.O. 2J-F100229(II)-519.	
		4074431		
		4077086		
		4079536		
		4081054-01	VIS, DIM	376 00
51	Bearing, Compressor Stator, 6th Stage	4074433	VIS, DIM	376 00
		4074434		
		4074435		
		4074436		
		4074437		
51A	Heat Shield, Compressor Stator, Assembly	4077646-01	VIS, FPI	363 00
		4077646-02		

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
52	Compressor Stator Segment Assembly, 7th Stage	4077077-01/04 4079087-01/04 4080497-01/04  4077877-01/02 4080737-01/02 4078227-01/02  4079687-01/04 4080487-01/04 4083877-01/02 4084257-01/02 4084357-01/02 4084477-01/02	VIS, DIM, and FPI  Note 1: During FPI, inspect for cracking at vane leading and trailing edge ID and OD.  Note 2: During dimensional inspection, measure depth of wear or fretting on surfaces  only.  Note 3: During visual and FPI, inspect for cracked damper anti-rotation lug welds. Note 4: Replace all abradable to new part limits. Refer to T.O. 2J-F100-53-7, WP 455 00.	355 00, 355 01
52A	Shroud - Compressor Stator, 7th Stage	4077287-01 4079207-01	RP - New honeycomb required	354 00
53	Compressor Stator Segment Assembly, 8th Stage	4077078-01/05 4079088-01/05 4077878-01/05 4080738-01/05 4078348-01/03 4079588-01/05 4083978-01/03 4084258-01/03 4084478-01/03	VIS, DIM, and FPI  Note 1: During FPI, inspect for cracking at vane leading and trailing edge ID and OD.  Note 2: During dimensional inspection, measure depth of wear or fretting on surfaces  only.  Note 3: During visual and FPI inspection, inspect for cracked damper anti-rotation lug welds. Note 4: Replace all abradable to new part limits. Refer to T.O. 2J-F100-53-7, WP 455 00.	355 00, 355 01
53A	Shroud - Compressor Stator, 8th Stage	4077288-01 4079208-01 4079214-01	RP - New honeycomb required	354 00

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
54	Compressor Stator Segment Assembly, 9th Stage	4077079-01/03 4079089-01/03 4078349-01/03 4080179-01/03 4077879-01/03 4080739-01/03 4079589-01/03 4083979-01 4084259-01 4084579-01	<p>VIS, FPI, and DIM</p> <p>Note 1: During FPI, inspect for cracking at vane leading and trailing edge ID and OD. Inspect for cracks in vane trailing edge approximately 1/2 inch from I.D. platform.</p> <p>Note 2: During dimensional inspection, measure depth of wear or fretting on surfaces   only.</p> <p>Note 3: During visual and FPI inspection, inspect for cracked damper anti-rotation lug welds.</p> <p>Note 4: Replace all abradable to new part limits. Refer to T.O. 2J-F100-53-7, WP 455 00.</p>	355 00, 355 01
54A	Shroud - Compressor Stator, 9th Stage	4077289-01 4079209-01	RP - New honeycomb required	354 00
55	Blade, Compressor Rotor, 7th Stage	4079707	RW to PN 4081507	374 00, 374 01
		4081507	VIS, FPI, and DIM	374 00, 374 01
56	Blade, Compressor Rotor, 8th Stage	4077508-01/04 or 4075608-01/04	<p>VIS, RW, and Note 1</p> <p>Note 1: Rework blade 4077508-01/04 and 4075608-01/04 to 4082208-01/04. Send blade to repair vendor.</p>	374 00, 374 01
		4079308-01/04	RW to PN 4082208-01/04	374 00, 374 01
		4082208 -01/04	VIS, FPI, and DIM	374 00, 374 01
57	Blade, Compressor Rotor, 9th Stage	4077509-01/04 or 4075609-01/04	<p>VIS, RW, and Note 1</p> <p>Note 1: Rework blade 4077509-01/04 and 4075609-01/04 to 4081609-01/04. Send blade to repair vendor.</p>	374 00, 374 01
		4079309-01/04	RW to PN 4081609-01/04	374 00, 374 01
		4081609-01/04	VIS, FPI, and DIM	374 00, 374 01

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
58	Blade, Compressor Rotor, 10th Stage	4077510-01/04 or 4075610-01/04	VIS, RW, and Note 1 Note 1: Rework blade 4077510-01/04 and 4075610-01/04 to 4082210-01/04. Send blade to repair vendor.	374 00, 374 01
		4079310-01/04	RW to PN 4082210-01/04	374 00, 374 01
		4082210-01/04	VIS, FPI, and DIM	374 00, 374 01
59	Blade, Compressor Rotor, 11th Stage	4077511-01/04 or 4075611-01/04	VIS, RW, and Note 1 Note 1: Rework blade 4077511-01/04 and 4075611-01/04 to 4081611-01/04. Send blade to repair vendor.	374 00, 374 01
		4079411-01/04	RW to PN 4081611-01/04	374 00, 374 01
		4081611-01/04	VIS, FPI, and DIM	374 00, 374 01
60	Blade, Compressor Rotor, 12th Stage	4077512-01/04 or 4075612-01/04	VIS, RW, and Note 1 Note 1: Rework blade 4077512-01/04 and 4075612-01/04 to 4082212-01/04. Send blade to repair vendor.	374 00, 374 01
		4079412-01/04	RW to PN 4082212-01/04	374 00, 374 01
		4082212-01/04	VIS, FPI, and DIM	374 00, 374 01
61	Blade, Compressor Rotor, 13th Stage	4077513-01/04 or 4075613-01/04	VIS, RW, and Note 1 Note 1: Rework blade 4077513-01/04 and 4075613-01/04 to 4081613-01/04. Send blade to repair vendor.	374 00, 374 01
		4079413-01/04	RW to PN 4081613-01/04	374 00, 374 01
		4081613-01/04	VIS, FPI, and DIM	374 00, 374 01
62	Compressor Rotor Assembly, Axial	4079287-01 4079349-01 4080405-01 4080407-01 4080101-01 4080720-01 4080812-01 4080883-01 4080884-01 4081552-01	For Reference Only	-
63	Disk Assembly, Drum Rotor, Rear Compressor, Rear	4073123-01 4080102-01 4081469-01	VIS, FPI, and DIM	361 00

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
64	Case, Compressor, 10th through 12th Stage	4077074 4078507	VIS, FPI, and DIM  Note 1: During dimensional inspection, measure Dia. B 22.836 to 22.842 inches if wear or fretting is evident.  Note 2: During dimensional inspection, measure Dia. D 24.920 to 24.924 inches if wear or fretting is evident.  Note 3: During dimensional inspection, measure Dia. E 23.078 to 23.082 inches if wear or fretting is evident.	368 00
65 through 69	Stator Segment, Compressor 10th through 12th Stage Assembly	4077920-01/04 4080030-01/04 4077880-01/04 4077080-01/05 4080730-01/04 4083880-01/04 4084480-01/04 4084530-01/04	VIS, FPI, and DIM  Note 1: During FPI, inspect for cracking at vane leading and trailing edge ID and OD.  Note 2: During dimensional inspection, measure depth of wear or fretting on Dia. D, J, and L only.  Note 3: During dimensional inspection, measure depth of wear or fretting on Surfaces E, F, H, K, and R only.  Note 4: During visual and FPI inspection, inspect for cracked damper anti-rotation lug weld.  Note 5: Replace all abradable to new part limits. Refer to T.O. 2J-F100-53-7, WP 452 00.	352 00, 352 01
69A	Shroud - Compressor Stator, 10th Stage	4080380-01 4080390-01	RP - New honeycomb required	354 00
69B	Shroud - Compressor Stator, 11th Stage	4080381-01 4080291-01	RP - New honeycomb required	354 00
69C	Shroud - Compressor Stator, 12th Stage	4080382-01	RP - New honeycomb required	354 00



**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
70	Tube Assembly, Scavenge, No. 4 Bearing, Internal	4072991-01 4081460-01	VIS, DIM	372 00
71	Connector, Tube, Static Pressure Probe	4076957	VIS, DIM, FPI	372 00
72	Seal Assembly, Air, No. 4 Bearing	4074849	VIS, FPI, DIM, RN, and Note 1  Note 1: Replace PN 4074849 with PN 4080807 per T.O. 2J-F100229(II)-523.	334 00
		4080807	VIS, FPI, DIM	334 00
72A	Support, Compressor Stator	4076490 4081300	VIS, DIM, FPI  Note 1: Visually inspect nut plates for galling. Note 2: Dimensionally inspect Dia. A and B only if wear is evident. Note 3: During FPI, inspect for cracks around OD flange snap Dia. and boltholes.	337 00
73	Tube Assembly, Pressure, No. 4 Bearing, Internal	4069160	RN	372 00
74	Compressor Stator Exit	4077913 4077723	VIS, FPI, DIM  Note 1: During dimensional inspection, measure depth of wear or fretting at rear OD platform <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">3</span> . Note 2: During visual inspection, inspect for hardface chipping on mount lug load face.	367 00
75	Tube Assembly, Air Supply, No. 4 Bearing Seal	4070082	VIS, DIM	372 00
76	Case Assembly, Diffuser	4075716 4079134 4079831	VIS, DIM, FPI	370 00
76A	Manifold Assembly, Compressor Discharge, Left	4074152	VIS, FPI	396 00
76B	Manifold Assembly, Compressor Discharge, Right	4074151	VIS, FPI	396 00

**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE and T.O. REFERENCE
77	Manifold Assembly, Pressure No. 4 Bearing, Internal	4035859	VIS, DIM, PC	372 00
78	Nozzle, Fuel	4075220 4076778	VIS	T.O. 6J8-40-3 T.O. 6J8-41-3
79	Ring, Air Sealing, No. 4 Bearing	4079426 4075867	VIS, DIM, FPI	333 00
80	Seal Assembly, No. 4 Bearing, Front	4074882 4080882	VIS, DIM, FPI	332 00
80A	Seal, No. 4 Face, Front	4035882 4035883	VIS, DIM	320 00
81	Housing, No. 4 Bearing	4035897	VIS, DIM, FPI	327 00, 327 01
82	Seat, No. 4 Bearing Seal, Front	4032669	VIS, DIM, MPI	306 00
83	Scoop, No. 4 Bearing	4032667	VIS, MPI, DIM	328 00, 328 01
84	Bearing, Roller, Cylindrical, No. 4	4059297 4059298 4059299 4061007	VIS, DIM	338 00 339 00
85	Seat Assembly, No. 4 Bearing Seal, Rear	4018635	VIS, DIM, MPI	306 00
85A	Nut, No. 4 Bearing Retaining, Inner	4007568	VIS, MPI	303 00
85B	Nut, No. 4 Bearing Retaining, Outer	4002513	VIS, MPI	303 00
86	Seal Assembly, No. 4 Bearing, Rear	4072349 4065871	VIS, DIM, FPI	326 00, 326 01
86A	Seal, No. 4 Face, Rear	4035882 4035883	VIS, DIM	320 00
87	Ring Assembly, Air Sealing, No. 4 Bearing, Rear	4075870-01	VIS, DIM, FPI	325 00
88	Chamber Assembly, Combustion	4077232 4077670 4077820 4079375 4080008 4080575 4083194	VIS, DIM, FPI, and Note 1  Note 1: Inspect igniter boss. Refer to T.O. 2J-F100-53-7, WP 358 00	358 00
89	Manifold Assembly, Fuel Supply, Left	4078196 -01 4081573-01	VIS, FPI, DIM, and Note 1  Note 1: Pressure check and inspect manifold.	340 00
90	Vane Assembly, Turbine Stator, 1st Stage	4069391	VIS, FPI	360 00

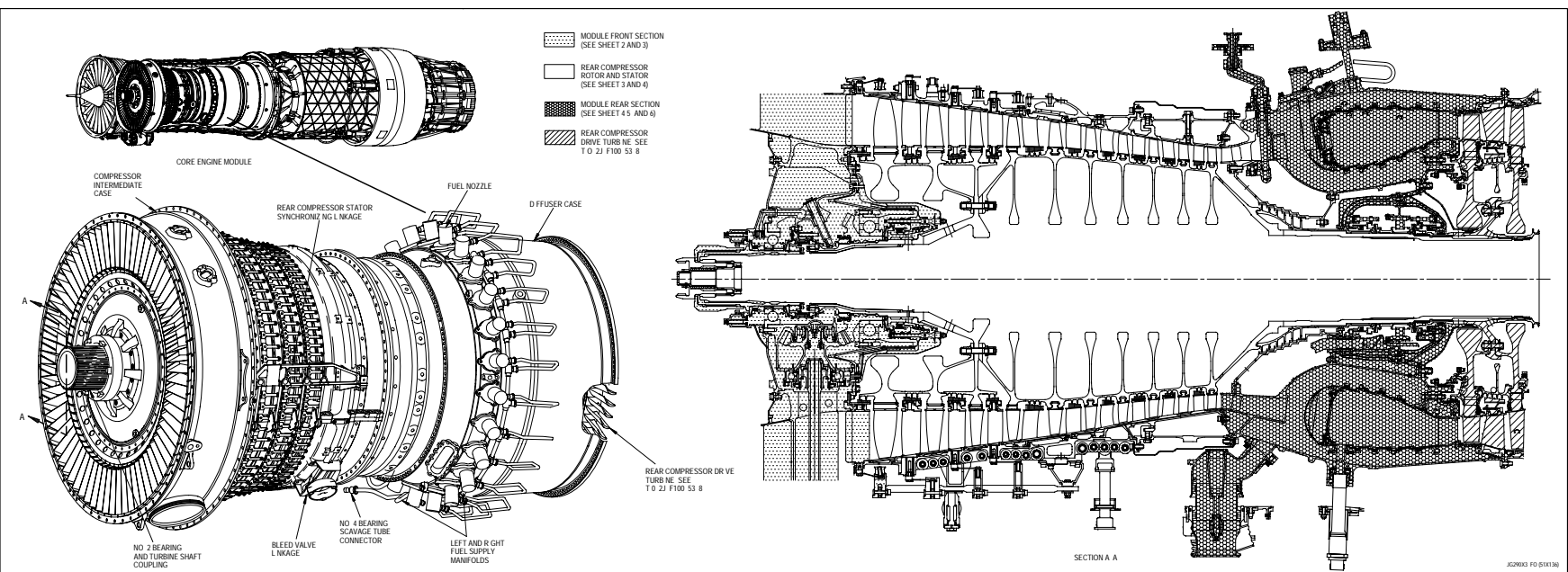
**Table 1. Core Engine Module (Without Rear Compressor Drive Turbine) Required Depot Maintenance for 4300 Cycle Rebuild Interval (continued)**

FIGURE INDEX NUMBER <sup>SWP</sup>	PART NAME	PART NUMBER	4300 CYCLE INSPECTION	T.O. 2J-F100-53-7 WORK PACKAGE REFERENCE
005 01				
91	Support Assembly, Turbine Stator, 1st Stage	4077398 4078357 4080080	VIS, FPI, DIM	359 00
92	Ring Assembly, Air Sealing, Turbine, Inner, 1st Stage	4070980-01	VIS, DIM, FPI	359 00
93	Ring Assembly, Air Sealing, Turbine, Outer, 1st Stage	4080012-01	VIS, DIM, FPI	359 00
94	Ring Assembly, Air Sealing, Turbine, 1st Stage	4070004-01 4080430-01	VIS, DIM, FPI	359 00
95	Nut, Rear Compressor Drive Shaft	4069335	VIS, FPI, DIM	350 00
96	Manifold Assembly, Fuel Supply, Right	4078195-01 4081572-01	VIS, FPI, DIM	340 00
97	Duct Segment - Compressor, 4th stage	4076124-02 4078484-02 4081672-02	VIS	388 00
98	Duct Segment - Compressor, 4th stage	4076124-02 4078484-02 4081672-02	VIS	388 00
99	Duct Segment - Compressor, 5th stage	4076125 4078485	VIS	388 00
100	Duct Segment - Compressor, 6th stage	4076126	VIS	388 00
101	Duct Segment - Compressor, 7th stage	4076127	VIS	388 00

## ACTION CODES

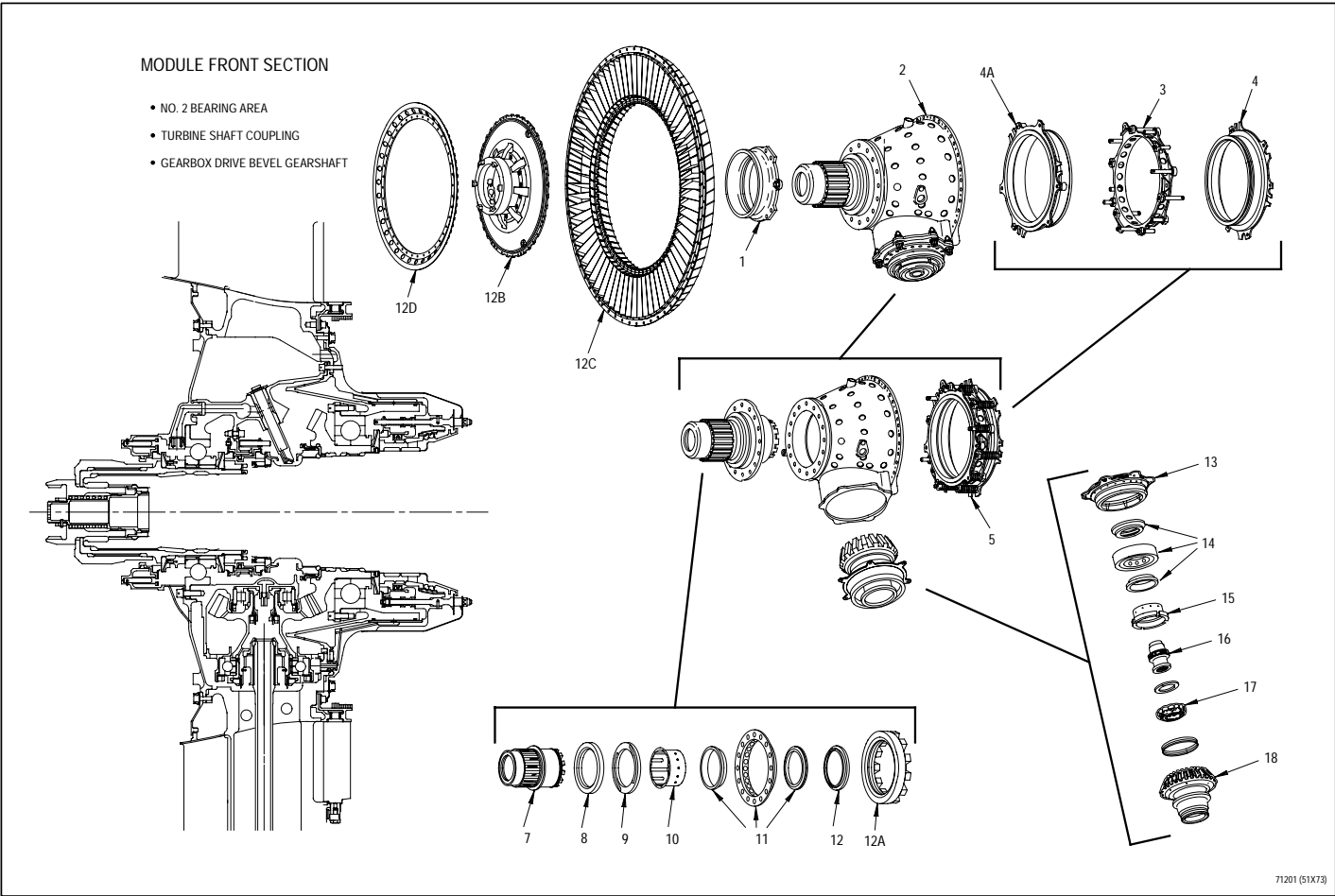
DIM - Dimensional inspection  
 ECI - Eddy current inspection  
 FPI - Fluorescent penetrant inspection  
 MPI - Magnetic particle inspection  
 NA - Not applicable (Part number cannot be used at this rebuild cycle)  
 PC - Pressure check  
 RN - Replace with new part  
 RW - Rework  
 VIS - Visual inspection





FO-1. Core Engine Module - Scheduled Maintenance (Sheet 1 of 6)

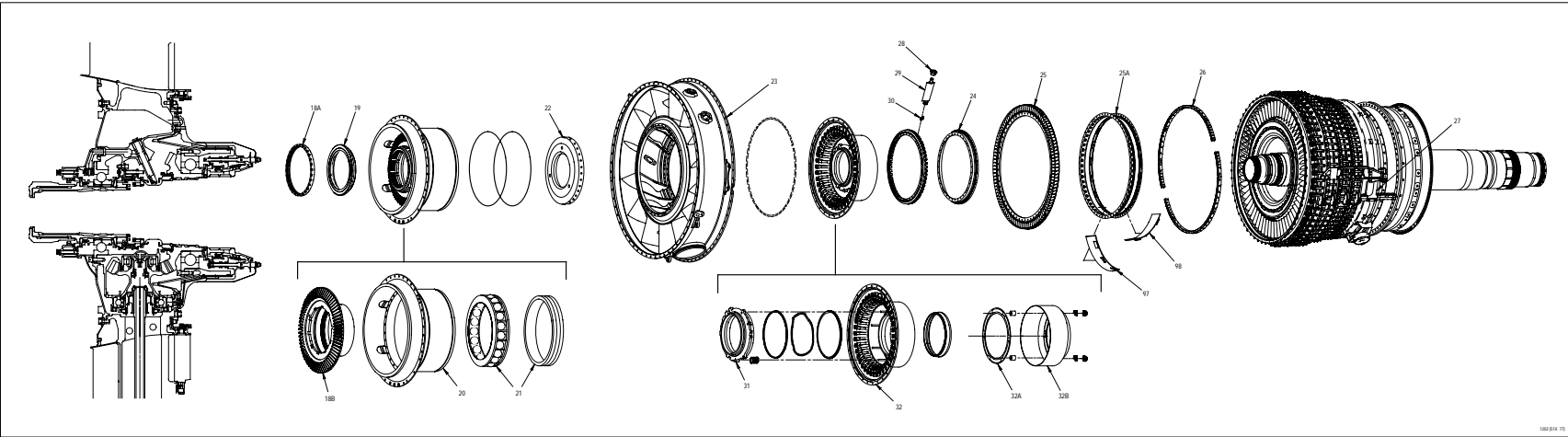




**FO-1. Core Engine Module - Scheduled Maintenance (Sheet 2 of 6)**

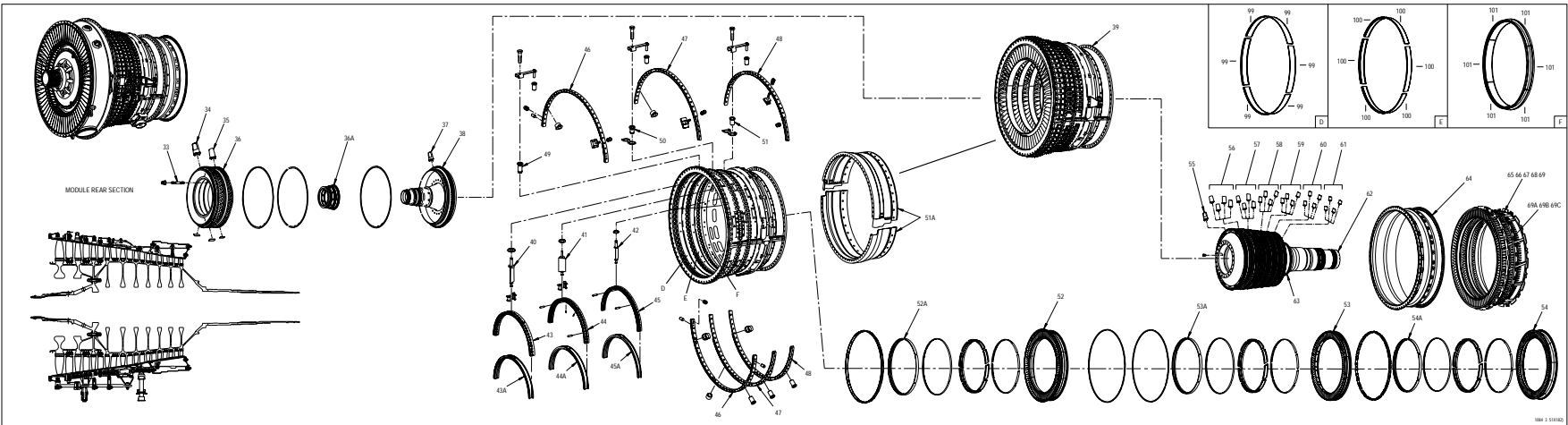






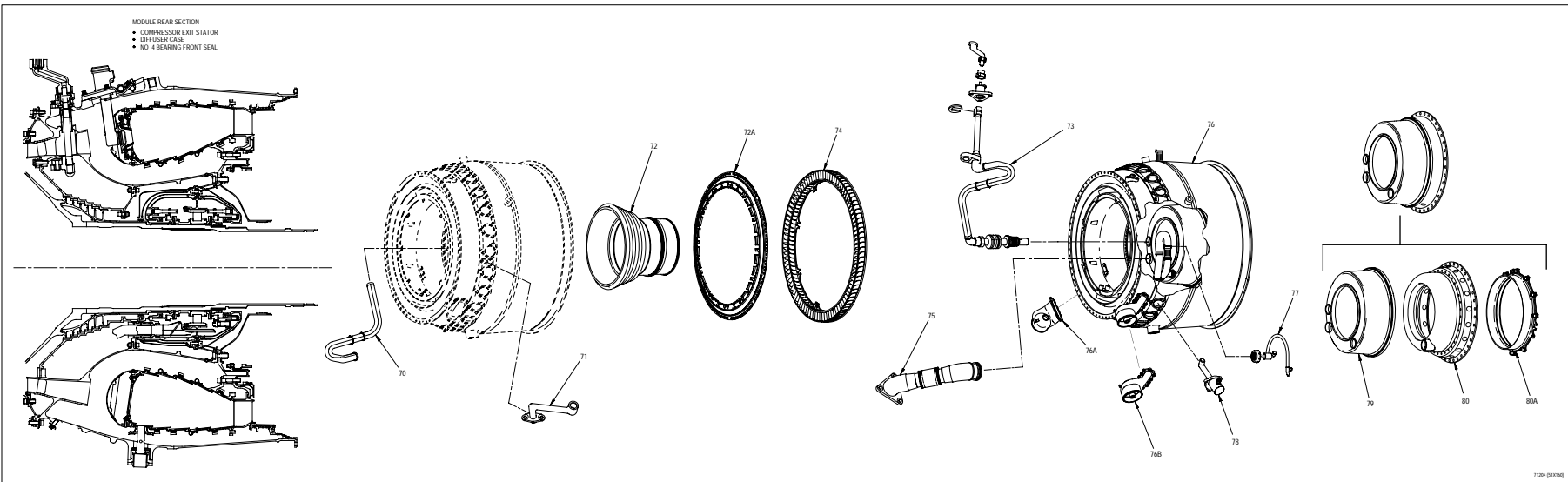
FO-1. Core Engine Module - Scheduled Maintenance (Sheet 3 of 6)





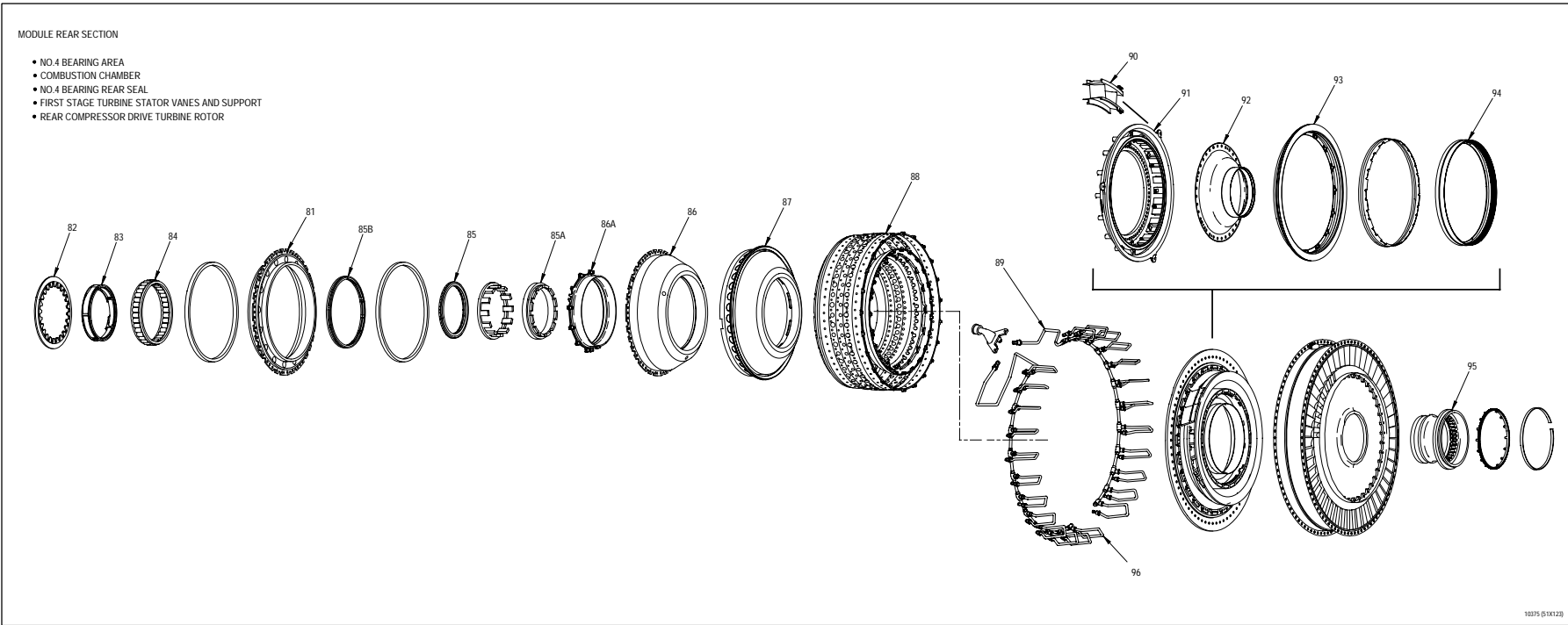
FO-1. Core Engine Module - Scheduled Maintenance (Sheet 4 of 6)





FO-1. Core Engine Module - Scheduled Maintenance (Sheet 5 of 6)





FO-1. Core Engine Module - Scheduled Maintenance (Sheet 6 of 6)





# WORK PACKAGE

## TECHNICAL PROCEDURES

### REAR COMPRESSOR DRIVE TURBINE -

## SCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

### LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 . . . . .	18	4 - 4A . . . . .	18	5 . . . . .	2
2 - 3 . . . . .	0	4B Blank . . . . .	5	6 Blank . . . . .	0

REFERENCE MATERIAL REQUIRED

Title	Number
Rear Compressor Drive Turbine - - - - -	T.O. 2J-F100-53-8

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package provides scheduled maintenance instructions for the rear compressor drive turbine.

**2. REAR COMPRESSOR DRIVE TURBINE  
SCHEDULED MAINTENANCE.**

(See FO-1 and Table 1.)

- a. See FO-1 and Table 1 for rear compressor drive turbine scheduled maintenance.

Table 1. Rear Compressor Drive Turbine Module - Scheduled Maintenance Inspection

FIGURE INDEX NUMBER	PART NAME	PART NUMBER	2150 CYCLES INSPECTION	4300 CYCLES INSPECTION	T.O. 2J-F100-53-8 WORK PACKAGE REFERENCE
1	Seal, Air, Turbine, 1st Stage	4069949 4080429	VIS, DIM, FPI, ECI, and Note 1	VIS, DIM, FPI, ECI, and Note 1	301 00
			Note1: Knife-edge seals and snap diameters do not require plasma to be stripped prior to FPI provided subject areas meet serviceable limits.		
2	Plate, Retaining, Blade, Turbine, Front, 1st Stage	4069990	VIS, DIM, FPI, ECI, and Note 1	VIS, DIM, FPI, ECI, and Note 1	302 00
			Note1: Knife-edge seals and snap diameters do not require plasma to be stripped prior to FPI provided subject areas meet serviceable limits.		
3	Disk, Turbine, 1st Stage	4069901 4080301	VIS, DIM, FPI, ECI, and Note 1	VIS, DIM, FPI, ECI.	304 00
			Note1: Measure and inspect areas 5, 6, 11 and Diameter BT only.		
4	Blade, Turbine Rotor, 1st Stage	4070801 4080201	VIS, DIM, FPI, and Notes 1 and 2.	VIS, DIM, FPI, and Note 1	303 00 318 00
			Note1: Perform moment weight and airflow inspections. Note2: Inspect part heat code per T.O. 2J-F100229(VI)-501.		
5	Plate, Retaining, Blade, Turbine, Rear, 2nd Stage	4061632	VIS, FPI, and Note 1	VIS, FPI, and Note 1	312 00
			Note1: Knife-edge seals and snap diameters do not require plasma to be stripped prior to FPI provided subject areas meet serviceable limits.		
6	Disk, Turbine, 2nd Stage	4069902 4077902	VIS, DIM, FPI, ECI, and Note 1	VIS, DIM, FPI, ECI.	311 00
			Note1: Measure and inspect area 2 and Diameter AX only.		
7	Blade Assembly, Turbine Rotor, 2nd Stage	4070292 4080342	VIS, DIM, FPI, and Note 1	VIS, DIM, FPI, and Note 1	310 00 318 00
			Note1: Perform moment weight and airflow inspections.		
8	Plate Assembly, Turbine Blade Retaining, 2nd Stage	4069989 4070147 4079623	VIS, FPI	VIS, FPI, ECI	309 00
9	Hub Assembly, Turbine, Rear Compressor, Drive	4069333	VIS, DIM, FPI, ECI, and Note 1	VIS, DIM, FPI, ECI	31400
			Note1: Inspect per T.O. 2J-F100229(VI)-502.		
10	Vane, Turbine Stator, 2nd Stage	4072682 4079192 4079932 4079942 4080352	VIS, FPI, and perform airflow inspection	VIS, FPI, and perform airflow inspection	308 00 319 00

**Rear Compressor Drive Turbine Module - Scheduled Maintenance Inspection (continued) (continued) (continued) (continued) (continued)**

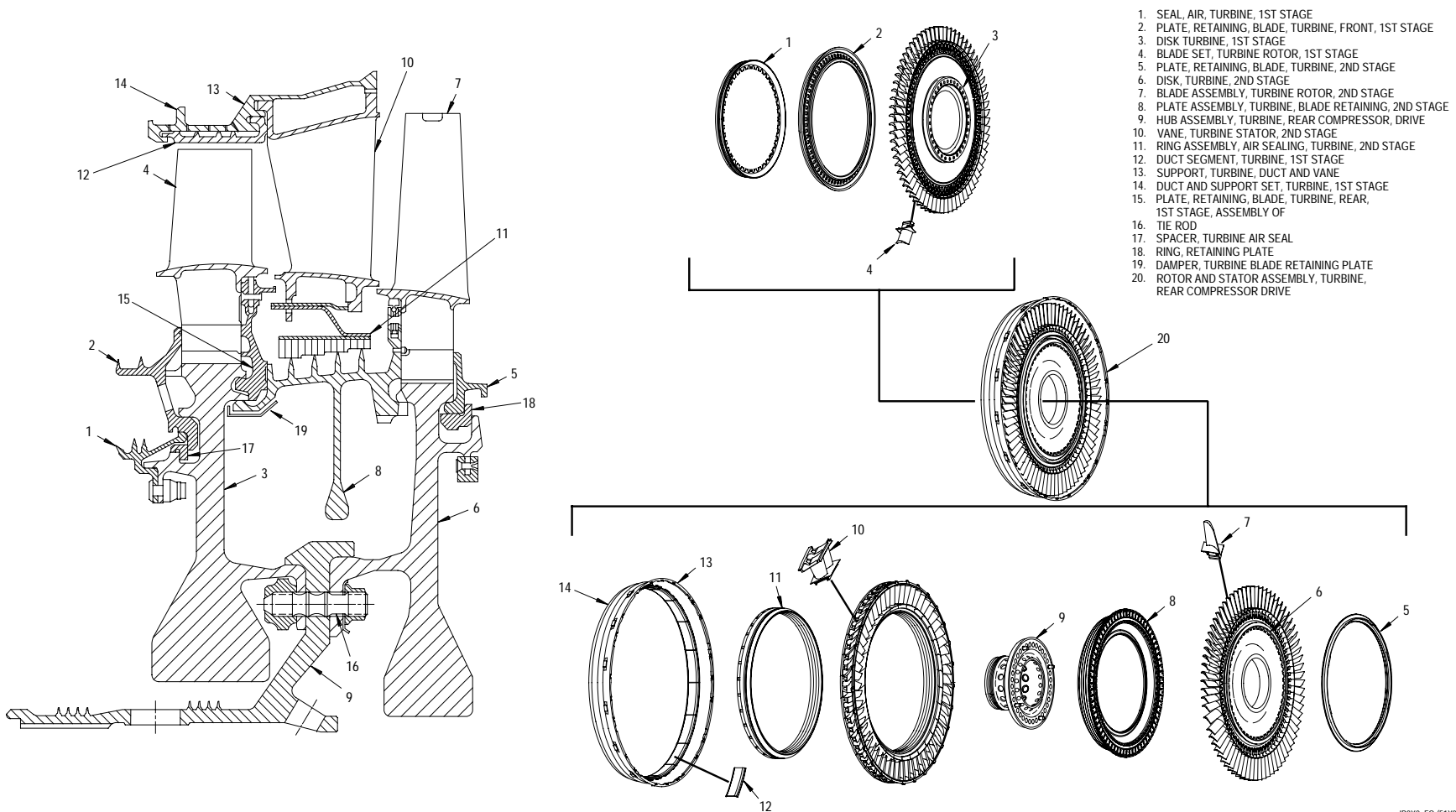
FIGURE INDEX NUMBER	PART NAME	PART NUMBER	2150 CYCLES INSPECTION	4300 CYCLES INSPECTION	T.O. 2J-F100-53-8 WORK PACKAGE REFERENCE
11	Ring Assembly, Air Sealing, Turbine, 2nd Stage	4075551-01	RN per	RN per	307 00
		4079961-01	T.O. 2J-F100(VI)-537.	T.O. 2J-F100(VI)-537.	
		4080394-01	VIS, FPI, DIM	VIS, FPI, DIM	307 00
12	Duct Segment, Turbine, 1st Stage	4076206	VIS, FPI	VIS, FPI	306 00
		4077954			
		4080636			
		4082503			
		4082861			
13	Support, Turbine, Duct and Vane	4078268	VIS, FPI, DIM	VIS, FPI, DIM	306 00
		4079857			
		4079969			
		4080637			
		4082487			
		4082863			
14	Duct and Support Set, Turbine, 1st Stage	4079332	VIS, DIM, FPI	VIS, DIM, FPI	306 00
		4079937	VIS, DIM, FPI, and Note 1	VIS, DIM, FPI, and Note 1	
		4079968			
		4080635	VIS, DIM, FPI, and Note 2	VIS, DIM, FPI, and Note 2	
		4082486			
		4082862	VIS, DIM, FPI	VIS, DIM, FPI	
			Note 1: Refer to T.O. 2J-F100(VI)-538. Note 2: Replace PN 4080635 and 4082486 with PN 4082862 per T.O. 2J-F100229(VI)-507.		
15	Plate, Retaining, Blade, Turbine, Rear, 1st Stage, Assembly of	4071355	VIS, FPI	VIS, FPI	305 00
		4077403			
		4079003			
		4079621			
		4080632			
16	Tie Rod	4071799	VIS, DIM, and Note 1	VIS, DIM, and Note 1	313 00
			Note 1: Inspect part per T.O. 2J-F100229(VI)-503.		
17	Spacer, Turbine Air Seal	4061748	VIS, FPI	VIS, FPI	316 00
18	Ring, Turbine Blade Retaining Plate	4060966	VIS, FPI	VIS, FPI	315 00
19	Damper, Turbine Blade Retaining Plate	4074864	VIS, FPI	VIS, FPI	317 00
20	Rotor and Stator Assembly, Turbine, Rear Compressor Drive	4068717-700	VIS	VIS	- -
		4068717-701			

## ACTION CODES

DIM - Dimensionally inspect  
 ECI - Eddy current inspect  
 FPI - Fluorescent penetrant inspect  
 MPI - Magnetic particle inspect  
 RN - Replace with new design part  
 RW - Rework  
 VIS - Visually inspect



JB2X2\_FO (51X85)







**WORK PACKAGE****TECHNICAL PROCEDURES****FAN DRIVE TURBINE MODULE -****SCHEDULED MAINTENANCE****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 12

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 . . . . .	27	6A Added . . . . .	18	8 Blank . . . . .	0
2 - 3 . . . . .	0	6B Blank Added . . . . .	18	9 . . . . .	0
4 - 6 . . . . .	27	7 . . . . .	24	10 Blank . . . . .	13

REFERENCE MATERIAL REQUIRED

Title	Number
Fan Drive Turbine Module - - - - -	T.O. 2J-F100-53-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

b

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package provides scheduled maintenance instructions for the fan drive turbine module.

**2. FAN DRIVE TURBINE MODULE SCHEDULED MAINTENANCE.**

(See FO-1 and Table 1.)

- a. See FO-1 and table 1 for fan drive turbine module scheduled maintenance.

Table 1. Fan Drive Turbine Module - Scheduled Maintenance Inspection

Figure Index Number	Part Name	Part Number	2150 Cycles Inspection	4300 Cycles Inspection	T.O. 2J-F100-53-9 Work Package Reference
1	Seat, Turbine Shaft Lock	4010246	VIS, DIM	VIS, DIM	340 00
2	Ring Assembly, Air Sealing, Turbine 4th Stage	4073591 4078194 4083113 4064226 4077092 4083114	VIS, FPI	VIS, FPI	318 00
3	Duct Turbine Exhaust Assembly, Front	4072533-01 4083112-01	VIS, FPI	VIS, FPI	341 00
4	Case, Turbine Exhaust	4071463-01	VIS, FPI, DIM	VIS, FPI, DIM	324 00
5	Duct, Turbine Exhaust Assembly, Rear	4072535-01	VIS, FPI	VIS, FPI	342 00
6	Seal, Assembly, No. 5 Bearing	4075044 4082618	VIS, DIM	VIS, DIM	325 00
7	Shield, Heat, No. 5 Bearing	4076292	VIS, FPI	Remove and replace	347 00
8	Spacer, No. 5 Bearing Heat Shield	4078450	VIS, FPI	VIS, FPI	348 00
9	No. 5 Bearing Assembly	4067893 4067894 4067895 4067896	VIS, DIM	VIS, DIM	332 00
10	Nut, Bearing Retaining (Externally Threaded)	4001681	VIS, MPI, DIM	VIS, MPI, DIM	326 00
11	Seat, No. 5 Bearing Seal	4021784	VIS	VIS	333 00
12	Nut, Bearing Retaining (Internally Threaded)	4022304	VIS, MPI, DIM	VIS, MPI, DIM	334 00
13	Guide, No. 5 Bearing	4075318	VIS and Note 1	VIS and Note 1	323 00
		4082488	VIS	VIS	
		Note 1: Replace PN 4075318 with PN 4082488 per T.O. 2J-F100229(III)-512.			
14	Nut, Bearing Retaining (Internally Threaded)	4060478	VIS, MPI	VIS, MPI	331 00
15	Support, No. 5 Bearing, Inner	4076393 4081128 4076392 4081129	VIS, FPI	VIS, FPI	335 00

Table 1. Fan Drive Turbine Module - Scheduled Maintenance Inspection (continued)

Figure Index Number	Part Name	Part Number	2150 Cycles Inspection	4300 Cycles Inspection	T.O. 2J-F100-53-9 Work Package Reference
16	Cap, Oil Check Assembly	4075986	VIS	VIS	336 00
17	Valve, Oil Check Assembly	4071849	VIS, RP, and Note 1	VIS, RP, and Note 1	337 00
		4082617	VIS	VIS	339 00
			Note 1: Reoperate PN 4071849 to PN 4082617 per T.O. 2J-F100229(III)-513.		
18	DELETED				
19	DELETED				
20	Seat, Ball Socket, No. 5 Bearing Support	4034066	VIS	VIS	327 00
21	Ball-End, Rod, No. 5 Bearing Support	4024675	VIS	VIS	328 00
22	DELETED				
23	Seal Assembly, Face, No. 5 Bearing	4014756 4014757	VIS	VIS	330 00
24	Nut, Compressor Drive Shaft, Front	4026463	VIS, FPI	VIS, FPI	301 00
25	Rotor and Stator Assembly, Front Compressor Drive Turbine	4068716 All dash numbers	See detail parts	See detail parts	
26	Shaft Assembly, Front Compressor Drive Turbine	4060568-01 4075102	VIS, DIM, FPI	VIS, DIM, FPI	302 00
27	Stiffener-Turbine Shaft, Front	4060566 4060565	VIS, DIM	VIS, DIM	343 00
28	Stiffener-Turbine Shaft, Rear	4060564	VIS, DIM	VIS, DIM	343 00
29	Shield, Heat, Front Compressor Drive Shaft, Turbine	4026467	VIS	VIS	344 00
30	Plug, No. 5 Bearing	4010079	VIS, FPI	VIS, FPI	345 00
31	Case and Duct Set, Turbine Rear	4071459 4079210	VIS, FPI, DIM, and Note 1	Remove from service	304 00
		4077683 4080000 4080043	VIS, FPI, DIM	Remove from service	
			Note 1: RN per T.O. 2J-F100(III)-516.		
31	Case, Turbine Rear, Assy of	4071430 4079211	VIS, FPI, DIM	Remove from service	304 00
32	Vane, Turbine Stator Assembly, 3rd Stage	4077443 4076473 4077423	VIS, FPI	VIS, FPI	306 00
33	Ring Assembly, Air Sealing, Turbine 3rd Stage	4075741-01	VIS, FPI	Remove from service	305 00

Table 1. Fan Drive Turbine Module - Scheduled Maintenance Inspection (continued)

Figure Index Number	Part Name	Part Number	2150 Cycles Inspection	4300 Cycles Inspection	T.O. 2J-F100-53-9 Work Package Reference
34	Ring-Retaining Segment, 3rd Stage	4073488 4073489	VIS, DIM	VIS, DIM	346 00
35	Ring Segment Assembly, Air Sealing, Turbine, 3rd Stage	4069978-01 4069977-01	VIS, FPI	Remove from service	303 00
36	Ring Assembly, Air Sealing, Turbine, 3rd Stage (Inner)	4064232	VIS, FPI	VIS, FPI	308 00
37	Seal, Air, Turbine, 3rd Stage	4071396	VIS, FPI, DIM, ECI	VIS, FPI, DIM, ECI (Note 1)	310 00
			Note 1: Knife-edge seals and snap diameters do not require plasma to be stripped prior to FPI provided subject areas meet serviceable limits.		
38	Blade, Turbine Rotor, 3rd Stage	4075403	VIS, FPI, DIM	Remove from service	313 00
		4081603	VIS, FPI, DIM	VIS, FPI, DIM	
39	Disk, Turbine, 3rd Stage	4073403 4080503 4080603	VIS, FPI, DIM, ECI	VIS, FPI, DIM, ECI	312 00
40	Tierod, Turbine	4071768	VIS, FPI, DIM	VIS, FPI, DIM	316 00
41	Hub Assembly, Turbine, Rear	4064229 4080136 4064230 4080135	VIS, FPI, DIM	VIS, FPI, DIM	317 00
42	Vane, Turbine Stator Assembly, 4th Stage	4075534 4075254	VIS, FPI	VIS, FPI	307 00
43	Ring Assembly, Air Sealing, Turbine, 4th Stage	4068968	VIS, FPI	Remove from service	309 00
44	Ring, Retaining, 4th Stage Stator	4073491	VIS, DIM	VIS, DIM	311 00
45	Ring Segment Assembly, Air Sealing, Turbine, 4th Stage	4069982-01 4069437-01	VIS, FPI	VIS, FPI	321 00
		4079812-01	RN (Note 1)	RN (Note 1)	
		4083666-01	VIS, FPI	VIS, FPI	
			Note 1: Replace PN 4079812-01 with PN 4083666-01 per T.O. 2J-F100229(III)-508.		
46	Support, Turbine Air Sealing Ring, 4th Stage	4071473 4081665	VIS, FPI	VIS, FPI	319 00

Table 2. Fan Drive Turbine Module - Scheduled Maintenance Inspection (continued)

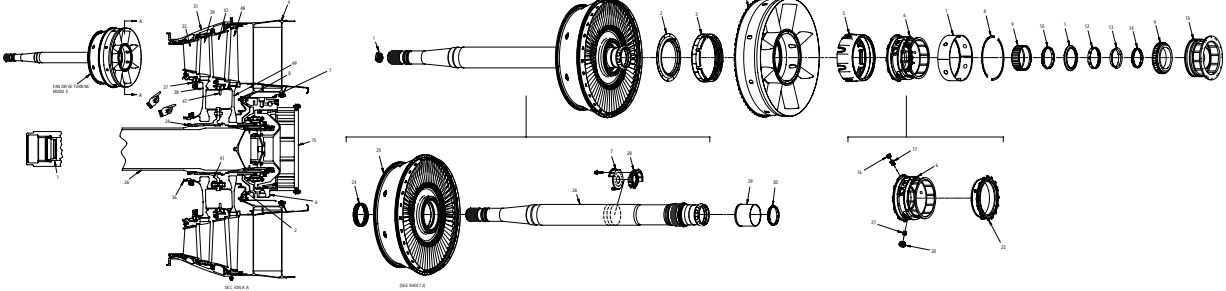
Figure Index Number	Part Name	Part Number	2150 Cycles Inspection	4300 Cycles Inspection	T.O. 2J-F100-53-9 Work Package Reference
47	Seal, Air, Turbine, 4th Stage	4073146	RN (Note 1)	RN (Note 1)	320 00
		4081755	VIS, FPI, DIM, ECI, (Note 2)	VIS, FPI, DIM, ECI (Note 2)	
		4082297	VIS, FPI, DIM, ECI	VIS, FPI, DIM, ECI	
			Note1: Replace PN 4073146 with PN 4082297 per T.O. 2J-F100229(III)-517.		
			Note2: Knife-edge seals and snap diameters do not require plasma to be stripped prior to FPI provided subject areas meet serviceable limits.		
48	Blade, Turbine Rotor, 4th Stage	4075404	RN (Note 1)	RN (Note 1)	314 00
		4080704	RN (Note 2)	RN (Note 2)	
		4082204	RN (Note 3)	RN (Note 3)	
		4082704	RN (Note 4)	RN (Note 4)	
		4082504	VIS, FPI, DIM	VIS, FPI, DIM	
			Note1: Replace PN 4075404 with PN 4080704 per T.O. 2J-F100229(III)-502.		
			Note2: Replace PN 4080704 with PN 4082204 per T.O. 2J-F100229(III)-507.		
			Note3: Replace PN 4082204 with PN 4082704 per T.O. 2J-F100229(III)-509 (F-16) or T.O.2J-F100229(III)-511 (F-15).		
	Note4: Replace PN 4082704 with PN 4082504 per T.O. 2J-F100229(III)-517.				
49	Disk Assembly, Turbine, 4th Stage	4072404	RN (Note 1)	RN (Note 1)	322 00
		4072484			
		4082604	VIS, FPI, DIM, ECI	VIS, FPI, DIM, ECI	
			Note1: Replace PN 4072404 or PN 4072484 with PN 4082604 per T.O. 2J-F100229(III)-517 and T.O. 2J-F100229(III)-518.		

## ACTION CODES

DIM - Dimensional Inspection  
 ECI - Eddy current inspection  
 FPI - Fluorescent penetrant inspection  
 MPI - Magnetic particle inspection  
 RN - Replace with new design part  
 RP - Repair/Reoperate  
 VIS - Visual inspection

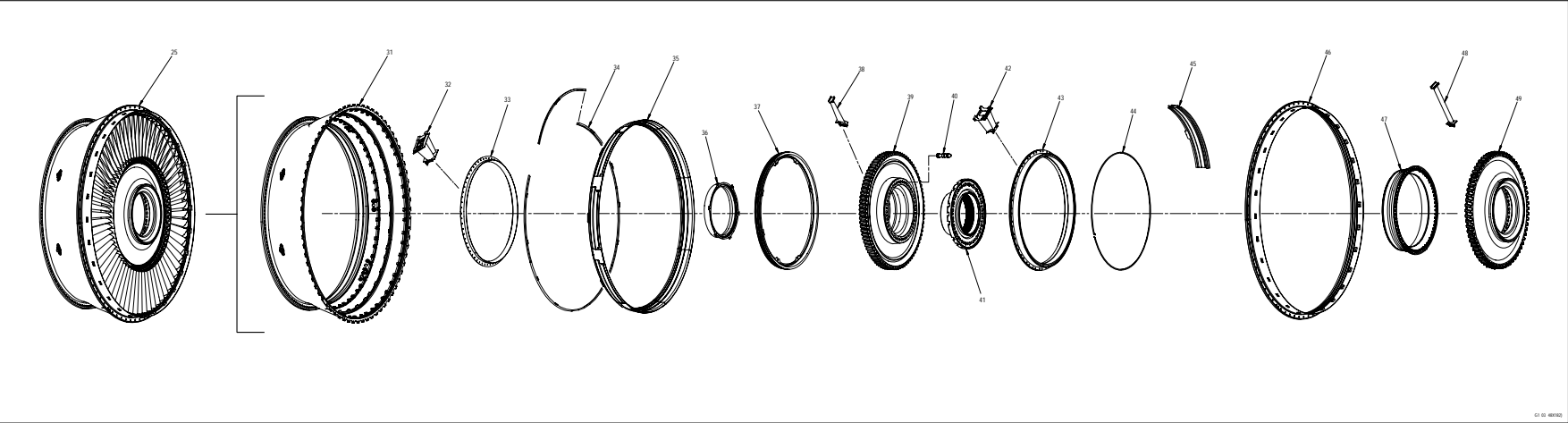






## FO-1. Fan Drive Turbine Module - Scheduled Maintenance (Sheet 1 of 2)





FO-1. Fan Drive Turbine Module - Scheduled Maintenance (Sheet 2 of 2)



WORK PACKAGE

TECHNICAL PROCEDURES

GEARBOX MODULE -SCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 . . . . .	16	5 - 6 . . . . .	16	8 Blank . . . . .	0
2 - 3 . . . . .	0	7 . . . . .	0	9 . . . . .	0
4 . . . . .	9			10 Blank . . . . .	0

REFERENCE MATERIAL REQUIRED

Title	Number
Gearbox Module, Maintenance Procedures - - - - -	T.O. 2J-F100-53-11
Oil Filter - - - - -	T.O. 7J2-27-3
Pump Assembly Scavenge, No. 2 and 3 Bearing, Gearbox - -	T.O. 7J4-2-50-3
Pump Assembly, Main Oil - - - - -	T.O. 7J4-2-51-3

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package provides scheduled maintenance instructions for the gearbox module.

**2. GEARBOX MODULE SCHEDULED MAINTENANCE.**

(See FO-1 and Table 1.)

- a. See FO-1 and table 1 for gearbox module scheduled maintenance.

Table 1. Gearbox Module - Scheduled Maintenance Inspections

Figure Index Number	Part Name	Part Number	Scheduled Depot Visit	T.O. 2J-F100-53-11 WP and Other References
1	Bearing	4067178	VIS, DIM	303 00
2	Coupling Assembly, Remote Gearbox Driveshaft	4067183	VIS, MPI	332 00
3	Coupling, Remote Gearbox Driveshaft	4067185		
4	Cover, Packing Gearbox	4002737	VIS	305 00
5	Retainer, Oil Seal Gearbox	4002707	VIS	304 00
6	Seal Assembly Gearbox Drive Spur Bevel Gearshaft	4047343	VIS, DIM	307 00
7	Valve Assembly, Breather Pressuring	4057681	VIS	331 00
8	Retainer, Oil Seal, Gearbox	4002716	VIS	304 00
9	Seal Assembly Deaerator Driveshaft	4047344	VIS, DIM	306 00
10	Tube, Transfer Packing	4017861	VIS	301 00 329 00
11	Filter, Oil	4071345	VIS	T.O. 7J2-27-3
12	Adapter, Straight	ST2000-04	VIS	334 00
13	Tube, Pressure, Oil Pump Idler Bearing	4057614-02	TBS	340 00
14	Housing, Reduction Gearbox	4066638	VIS, FPI	311 00
15	Bracket, Loop Clamp	4066445	TBS	341 00
16	Detector, Metal Chip, Oil Sump	4076098	VIS	302 00
17	Pump Assembly, Scavenge No. 2 and 3 Bearing Gearbox	4047890	VIS, DIM, FPI, MPI	T.O. 7J4-2-50-3
18	Connector, Tube Oil Tank Scavenge	4044147	VIS	301 00
19	Tube, Scavenge, Main Oil Pump	4045639-01	VIS	301 00
20	Pump Assembly, Main Oil	4071018	VIS, DIM, MPI, FPI	T.O. 7J4-2-51-3
21	Bearing	4032003	VIS, DIM	303 00
22	Housing Assembly, Gearbox Front	4068639	VIS, FPI	312 00
23	Bearing	4032004	VIS, DIM	303 00
24	Gear, Spur, Gearbox (53 Teeth)	4002724	VIS, MPI	320 00
25	Shaft, Gearbox Idler Gear	4053557	VIS, MPI	316 00
26	Bearing	4032002	VIS, DIM	303 00
27	Gear, Spur, Gearbox	4002706	VIS, MPI	319 00
28	Gearshaft, Bevel Spur Gearbox Drive	4067176	VIS, MPI, DIM	314 00
29	Bearing	4054537	Replace with new part.	-
		4080062-01	Replace with new part.	
30	Housing Assembly, Gearbox	4070990	VIS, FPI	310 00
31	Tube, Scavenge, Gearbox	4023577	VIS, FPI	336 00



**Table 1. Gearbox Module - Scheduled Maintenance Inspections (continued)**

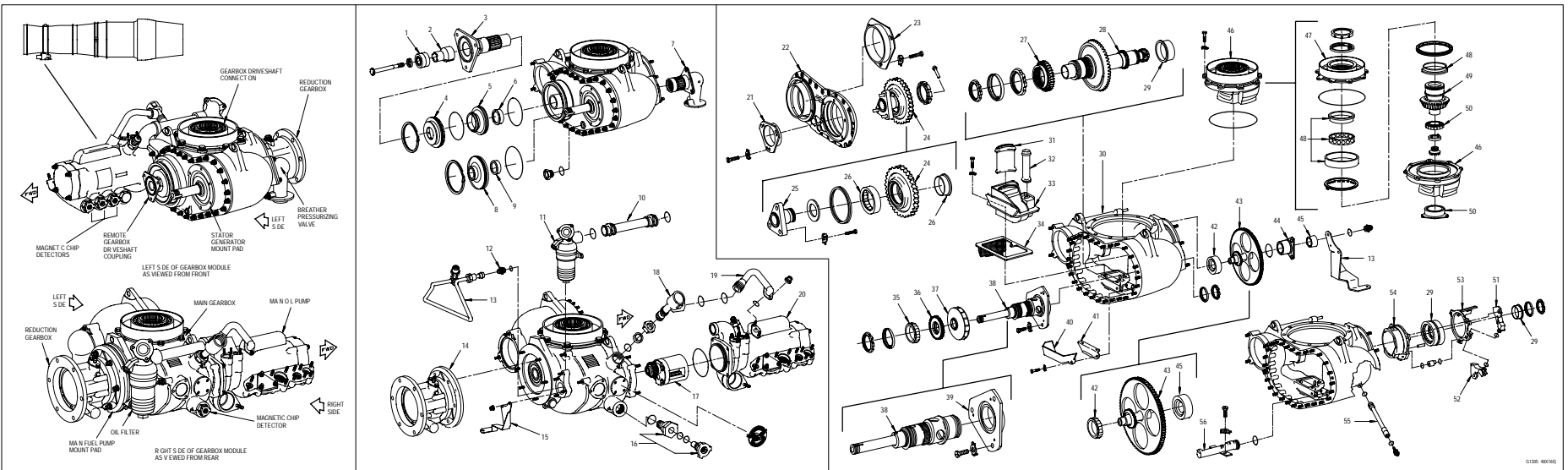
Figure Index Number	Part Name	Part Number	Scheduled Depot Visit	T.O. 2J-F100-53-11 WP and Other References
32	Tube, Scavenge, Gearbox	4023576	VIS, FPI	336 00
33	Cover, Gearbox Sump Assembly	4068434	VIS, FPI	326 00
34	Screen, Protective, Gearbox Sump	4058696	TBS	342 00
35	Bearing	4032003	VIS, DIM	303 00
36	Gear, Spur Gearbox (48 teeth)	4002718	VIS, MPI	322 00
37	Impeller, Gearbox Deaerator	4002719	VIS, DIM, FPI	323 00
38	Shaft, Gearbox Deaerator Impeller	4038802	VIS, MPI	317 00
39	Bearing	4032006	VIS, DIM	303 00
40	Baffle, Gearbox Assembly	4068474	VIS, FPI	330 00
41	Baffle, Gearbox Housing	4068423	VIS, FPI	330 00
42	Bearing	4061214	RN	-
43	Gearshaft, Spur, Gearbox (23 and 99 teeth)	4017949	VIS, MPI	313 00
44	Housing, Gearbox Bearing	4057335	VIS, FPI	335 00
45	Bearing	4032007	RN	-
46	Cover Assembly, Gearbox, Upper	4047095	VIS	324 00
47	Sleeve, Sealing, Gearbox	4070028	VIS, FPI	325 00
48	Bearing	4081473	VIS, DIM	303 00
49	Gearshaft, Bevel, Gearbox	4025256	VIS, MPI	318 00
50	Bearing	4032005	VIS, DIM	303 00
51	Nozzle, Oil, Gear Pump	4065137	VIS	338 00
52	Nozzle, Oil, Gear Pump	4065139	VIS	338 00
53	Plate, Retaining, Gearbox Bearing	4065138	VIS, MPI	328 00
54	Plate, Retaining, Gearbox Bearing	4064002	VIS, MPI	327 00
55	Tube, Transfer Packing, Gearbox	4057337	VIS	338 00
56	Nozzle, Gearbox Bearing	4057397	VIS	337 00
57	Gear, Internal, Main Fuel Pump Drive	4061076	VIS, MPI	315 00
58	Bearing	4062708	VIS, DIM	303 00
59	Spacer, Gearbox Bearing Inner	4061080	VIS, FPI	321 00
60	Nozzle, Gearbox Bearing	4061081	VIS	333 00
61	Spacer, Gearbox Bearing Outer	4061079	VIS, FPI	321 00
62	Bearing	4062707	VIS, DIM	303 00
63	Seat, Gearbox Bearing Seal	4066397	VIS, DIM, MPI	309 00

Table 1. Gearbox Module - Scheduled Maintenance Inspections (continued)

Figure Index Number	Part Name	Part Number	Scheduled Depot Visit	T.O. 2J-F100-53-11 WP and Other References
64	Retainer, Oil Seal Gearbox	4061082	VIS, FPI	339 00
65	Seal Assembly	4065385 4065386 4061088 4065596	VIS, DIM	308 00

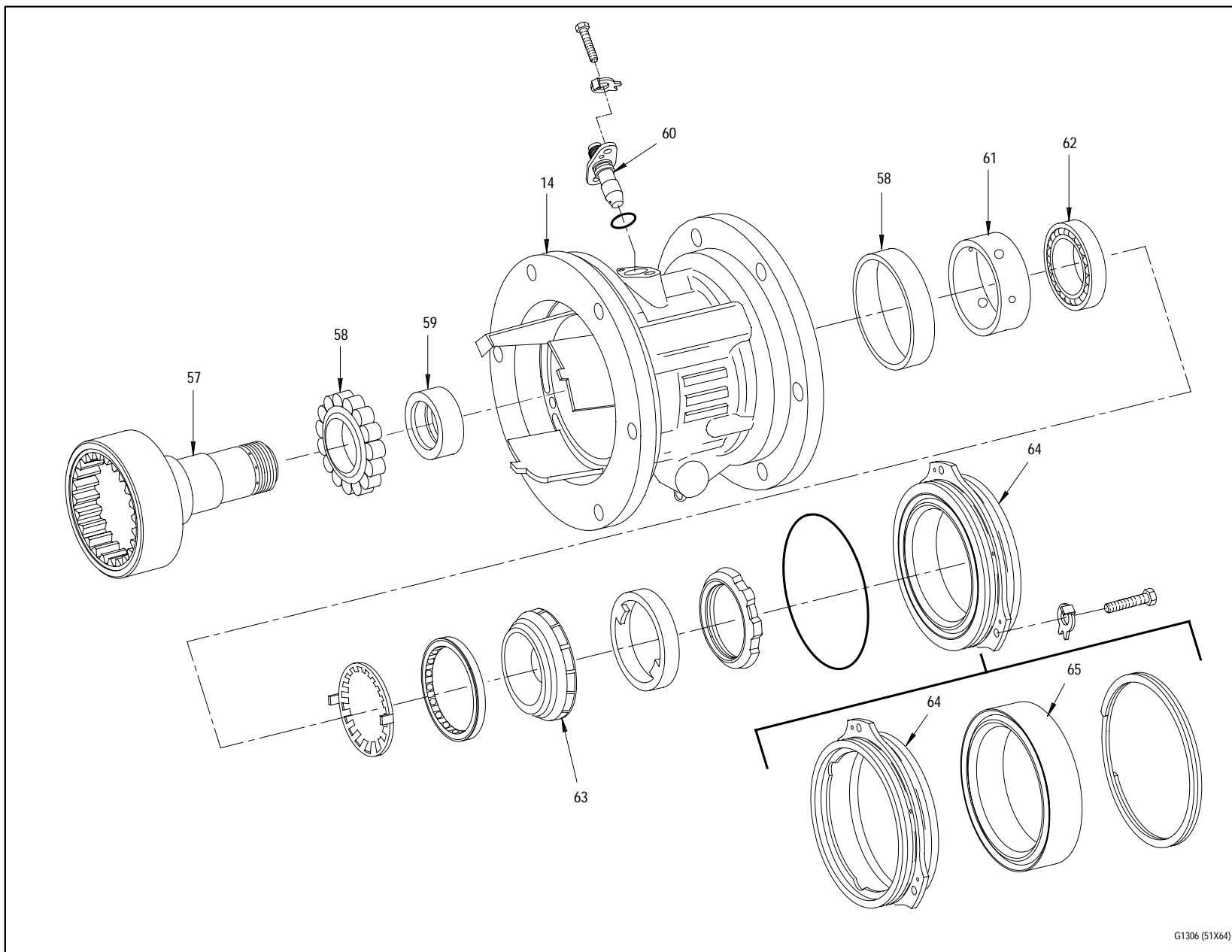
**ACTION CODES**

DIM - Dimensional inspection  
FPI - Fluorescent penetrant inspection  
MPI - Magnetic particle inspection  
RN - Replace with new part  
VIS - Visual inspection



FO-1. Gearbox Module - Scheduled Maintenance (Sheet 1 of 2)





FO-1. Gearbox Module - Scheduled Maintenance (Sheet 2 of 2)



**WORK PACKAGE****TECHNICAL PROCEDURES****ENGINE CONTROLS -****SCHEDULED MAINTENANCE****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 8

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 - 5 . . . . .					
6 Blank . . . . .					
7 . . . . .					
8 Blank . . . . .					

REFERENCE MATERIAL REQUIRED

Title	Number
Engine Accessories and Rigging - - - - -	T.O. 2J-F100-53-4

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None



**1. INTRODUCTION.**

- a. This work package provides scheduled maintenance instructions for the engine controls.

**2. ENGINE CONTROLS SCHEDULED MAINTENANCE.**

(See FO-1 and Table 1.)

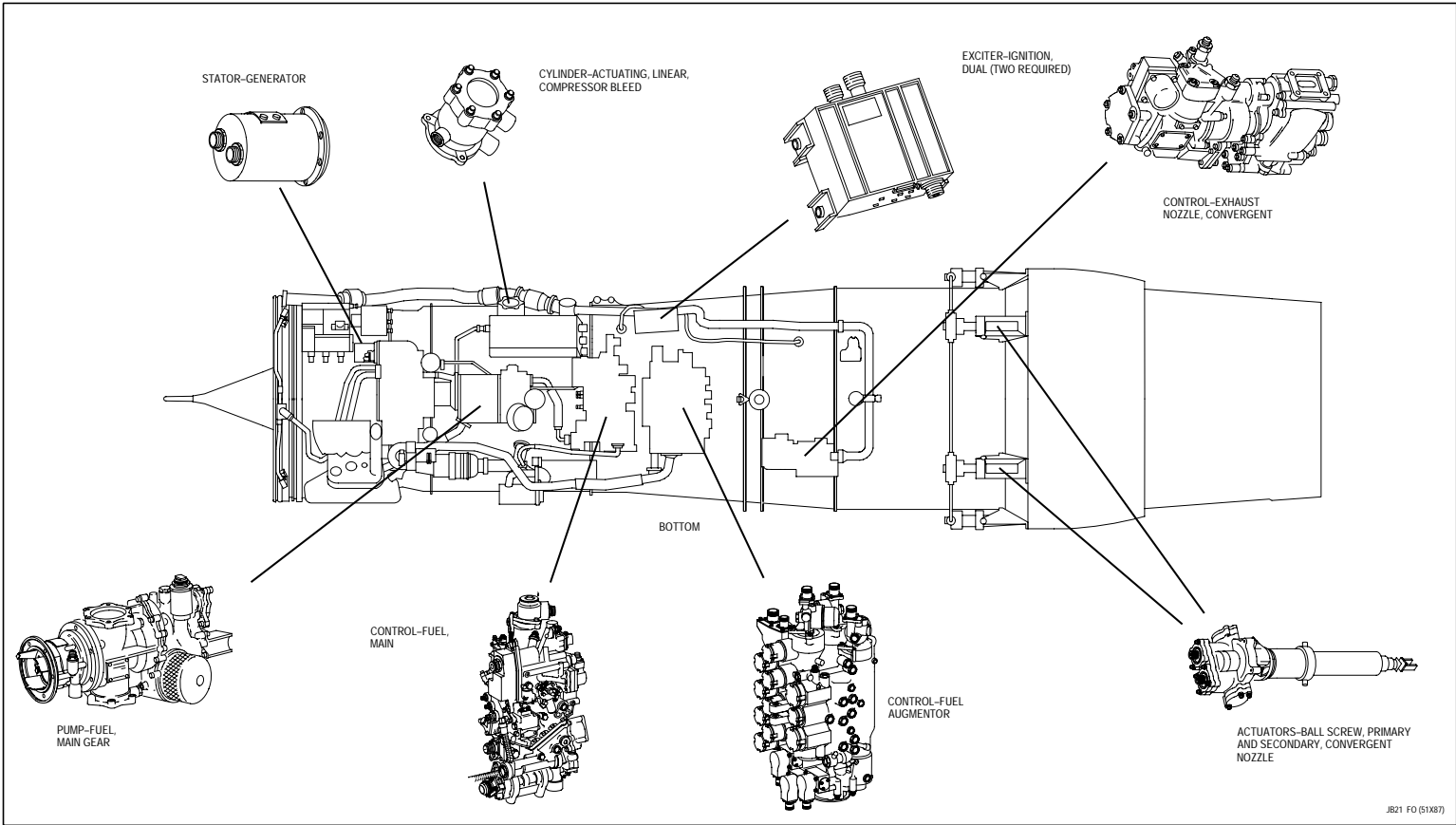
- a. See FO-1 and table 1 for engine controls scheduled maintenance.

Table 1. Engine Controls - Scheduled Maintenance Inspection

Figure Index Number	Part Name	Part Number	Scheduled Depot Visit	T.O. 2J-F100-53-4 Work Package Reference
1	Stator, Generator	4057416	VIS	021 00
2	Cylinder, Actuator Linear, Compressor Bleed	4069243	VIS, DIM	038 00
3	Exciter, Ignition, Dual	4060998	VIS	026 00
4	Control, Exhaust Nozzle, Convergent	4076322	VIS, DIM, MPI	044 00
5	Actuator, Ball Screw, Primary, Convergent Nozzle	4076324	VIS, DIM	043 00
6	Actuator, Ball Screw Secondary, Convergent Nozzle	4076323	VIS, DIM	043 00
7	Fuel Control, Augmentor	4070290	VIS, DIM, FPI, MPI	010 00
8	Fuel Control, Main	4070897	VIS, FPI, MPI	009 00
9	Pump, Gear, Main Fuel	4065756	VIS, DIM, FPI, MPI	005 00
10	Cylinder, Actuating, Linear, Variable Vane, Compressor, Inlet	4067838	VIS, DIM	037 00
11	Pump, Fuel, Augmentor	4071353	VIS, FPI, MPI	013 00
12	Control and Cylinder, Variable Vane, Compressor Inlet	4067837	VIS, DIM	036 00
13	Controller, Fuel Pump, Augmentor	4070461	VIS, DIM, MPI	012 00
14	Cylinder, Actuating, Linear, Variable Vane Rear Compressor	4061378	VIS, DIM	034 00

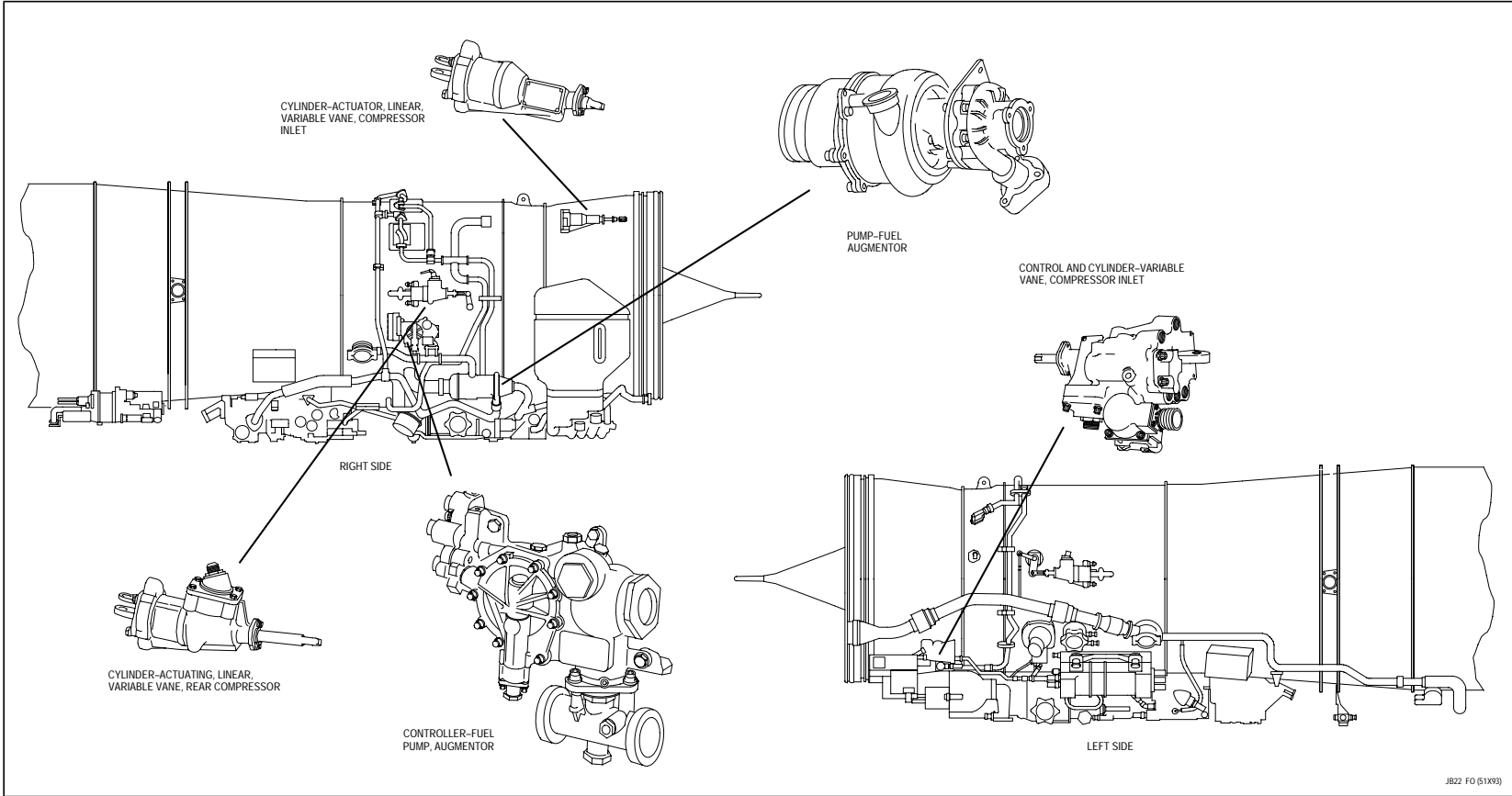
**ACTION CODES**

VIS	- Visual inspection
DIM	- Dimensional inspection
FPI	- Fluorescent penetrant inspection
MPI	- Magnetic particle inspection



**FO-1. Engine Controls - Scheduled Maintenance (Sheet 1 of 2)**





**FO-1. Engine Controls - Scheduled Maintenance (Sheet 2 of 2)**



# WORK PACKAGE

## TECHNICAL PROCEDURES

### AUGMENTOR DUCT AND NOZZLE MODULE -

## SCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

### LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 9 . . . . .	8	11 . . . . .	8	13 . . . . .	8
10 Blank . . . . .	8	12 Blank . . . . .	8	14 Blank . . . . .	8

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Engine - - - - -	T.O. 2J-F100-53-5
Augmentor Duct and Nozzle Module - - - - -	T.O. 2J-F100-53-10
Illustrated Parts Breakdown - - - - -	T.O. 2J-F100-54

Additional required reference material can be found in table.

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cleaner, Liquid	B&B 3100 NSN 6850-00-181-7597

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None



**1. INTRODUCTION.**

- a. This work package provides scheduled maintenance instructions for the augmentor duct and nozzle module.
- b. The purpose of this work package is to ensure upgrading, inspection, and refurbishment as required in order to reduce unscheduled engine removal for on condition maintenance and to maintain augmentors at maximum durability.
- c. The schedule for inspection, repair, or refurbishment provided in this work package essentially brings the module back to zero time.
- d. Annotate in module AFTO 95 records, the module engine operating time (EOT), augmentor cycles, and augmentor operating time. Return module to service until next scheduled maintenance requirement.

**2. NOZZLE CLEANING.**

- a. Exterior portion of exhaust nozzle may be cleaned prior to disassembly, inspection, or repair.
- b. Disconnect external flaps at rear, if present, and fan outward to expose convergent and divergent segments.

**NOTE**

Water for diluting cleaning solution and for rinsing shall meet process water requirements. Refer to T.O. 2-1-111.

- c. Dilute 1 part B&B 3100 (NSN 6850-00-181-7597) with 4 parts water. A mixture of 2 quarts B&B 3100 to 8 quarts of water will yield 2.5 gallons of cleaner, adequate for one engine nozzle.
- d. Apply cleaner to entire exterior of nozzle with a pressurized sprayer such as a spray cart or fire extinguisher bottle, procured locally. Allow solution to stand on nozzle approximately five minutes, then rinse with water.
- e. Lubricating compounds will probably not be completely removed by cleaning, but should be reapplied at final assembly.
- f. For augmentor duct and nozzle module scheduled cleaning, refer to T.O. 2J-F100-53-10.

**3. AUGMENTOR MODULE REMOVAL/  
DISASSEMBLY.**

- a. For removal of augmentor duct and nozzle module, refer to T.O. 2J-F100-53-5.
- b. For disassembly of augmentor duct and nozzle module, refer to T.O. 2J-F100-53-10.

**4. PRELIMINARY INSTRUCTIONS.**

(See FO-1 and Table 1.)

- a. Identify part and figure index number from fold-out (FO) drawing at end of this WP. See FO-1.
- b. Refer to Required Scheduled Depot Maintenance table. See table 1. Table is organized with the following information:
  - (1) Figure Index Number  
(reference to fold-out drawing)
  - (2) Part Nomenclature (part name)
  - (3) Part Number
  - (4) Action Required (part disposition action codes)
  - (5) References (appropriate module T.O. and inspection WP/SWP)

- c. Locate appropriate figure index number in table.
- d. Verify part nomenclature against in-hand part.

**NOTE**

- Part numbers for a particular figure index number/part nomenclature are arranged in increasing numerical order.
  - Part numbers specified in table are typical part numbers. Other part numbers may be generated as a result of later engineering changes as they are approved for production incorporation. Refer to T.O. 2J-F100-54 Illustrated Parts Breakdown to confirm usability if further clarification becomes necessary.
  - If a part number cannot be found in either table or T.O. 2J-F100-54 Illustrated Parts Breakdown, that part may not be applicable to engine build.
- e. Locate appropriate part number in table.

**NOTE**

Action code descriptions are found at end of table.

f. Refer to Action Required column to determine part disposition action code.

g. Part numbers require the following action:

(1) Perform action codes listed.

(2) Return acceptable part to service.

**NOTE**

The following step may not apply to all users. Refer to local cognizant authority to determine applicability.

h. Part numbers that reference a Note, and Note contains instructions to rework (RW) part in accordance with a TCTO then reidentify to a different part number, require the following action:

(1) Perform action codes listed.

(2) After action codes are complete, part shall be reworked in accordance with TCTO listed in Note.

(3) After performing work required by TCTO, reidentify part to new part number.

(4) After reidentifying part to new part number, perform action codes for new part number. If new part number also references a Note, and Note contains instructions to rework part in accordance with a different TCTO, perform action codes listed, rework part in accordance with TCTO, and reidentify part to new part number. Repeat this step, as necessary, until no new TCTO is referenced.

**5. AUGMENTOR DUCT AND NOZZLE MODULE SCHEDULED MAINTENANCE.**

(See FO-1 and table 1.)

**NOTE**

Part numbers specified in table 1 are typical part numbers. Other part numbers may be generated as a result of later engineering changes as they are approved for production incorporation. Refer to T.O. 2J-F100-54 Illustrated Parts Breakdown to confirm usability if further clarification becomes necessary.

Table 1. Augmentor Duct and Nozzle Module Required Scheduled Depot Maintenance

FIGURE INDEX NUMBER	PART NOMENCLATURE	PART NUMBER	ACTION REQUIRED	T.O. 2J-F100-53-10 WP/SWP AND OTHER REFERENCES
<p align="center"><b>NOTE</b></p> <p>Part numbers specified are typical part numbers. Other part numbers may be generated as a result of later engineering changes as they are approved for production incorporation. Refer to T.O. 2J-F100-54 Illustrated Parts Breakdown to confirm usability if further clarification becomes necessary.</p>				
1	Support , Augmentor Nozzle Assembly	4071150	VIS, D, and PTH	324 00
		4080513	VIS, D, and PTH	
2	Duct, Augmentor Combustion Chamber Assembly	4073475	VIS	T.O. 2J-F100-53-10 WP 328 00
3	Liner, Augmentor Combustion Chamber Assembly	4079666-01	VIS, D, and PTH	303 00
			NOTE 1: Inspect first for worn or missing plasma/thermal barrier coating.	
4	Cover, Finger Valve	4004056	VIS	327 00
5	Spring, Finger Valve	4004058	VIS	327 00
6	Spacer, Finger Valve	4004057	VIS	327 00
7	Support (Left), Augmentor Nozzle Actuator	4011121	VIS and PTH	325 00
8	Bearing Option	4045695	VIS	325 00
9	Shaft, Flexible, Secondary Actuator, Convergent Nozzle	4020265	VIS	T.O. 2J-F100-53-4WP 042 00
10	Pin	MS9245-28	RN	-
11	Support (Right), Augmentor Nozzle Actuator	4011122	VIS and PTH	325 00
12	Seat, Helical Compression Spring	4011105	VIS	326 00
13	Seal, Augmentor Divergent Nozzle Segment Assembly	4076459	VIS, D, and PTH	305 00
			NOTE 1: Inspect first for worn or missing plasma/thermal barrier coating.	
14	Washer, Key	4070358	RN	-
15	Clamp, Bridge, Augmentor Divergent Nozzle Seal Assembly	4077151	VIS, D, and PTH	306 00
			NOTE 1: Inspect first for worn or missing plasma/thermal barrier coating.	

Table 1. Augmentor Duct and Nozzle Module Required Scheduled Depot Maintenance (continued)

FIGURE INDEX NUMBER	PART NOMENCLATURE	PART NUMBER	ACTION REQUIRED	T.O. 2J-F100-53-10 WP/SWP AND OTHER REFERENCES
16	Lock, Augmentor Convergent Nozzle Hinge Pin	4072948	RN	-
17	Nozzle Segment, Convergent, Augmentor Assembly	4070741	VIS and D	310 00
			NOTE 1: Inspect first for worn or missing plasma/thermal barrier coating.	
18	Pin, Augmentor Convergent Nozzle Segment Hinge Assembly	4070743	VIS and D	310 00
19	Nozzle Segment, Divergent, Augmentor Assembly	4071142	VIS, D, and PTH	314 00
			NOTE 1: Inspect first for worn or missing plasma/thermal barrier coating.	
20	Washer, Key ID	4024873	RN	-
21	Connecting Link Option	4070115-01	VIS, D, and PTH	320 00
22	Pin	MS9245-24	RN	-
23	Nozzle Segment, External, Augmentor Assembly	4071141	VIS and D	332 00
24	Washer, Key	4025416	RN	-
25	Retainer, Augmentor Nozzle Pin	4048999	VIS	319 00
26	Bracket Option	4075771	VIS, D, and PTH	318 00
27	Seal, Augmentor Nozzle Support	4071718	VIS, D, and PTH	333 00
28	Support (Right), Augmentor Nozzle	4071123	VIS and PTH	322 00
29	Support (Left), Augmentor Nozzle	4071122	VIS and PTH	322 00
30	Cam Follower, Roller Bearing, Augmentor Nozzle	4050564	VIS and D	323 00
31	Pin	MS9245-25	RN	-
32	Bearing Option	4071400	VIS, D, and PTH	321 00
33	Connecting Link, Augmentor Nozzle Synchronizing Ring	4071329	VIS, D, and PTH	321 00

Table 1. Augmentor Duct and Nozzle Module Required Scheduled Depot Maintenance (continued)

FIGURE INDEX NUMBER	PART NOMENCLATURE	PART NUMBER	ACTION REQUIRED	T.O. 2J-F100-53-10 WP/SWP AND OTHER REFERENCES
34	Bolt, Shoulder	4071327	RN	-
		4081773	RN	
35	Ring, Synchronizing, Augmentor Nozzle Assembly	4074229-01	VIS, D, and PTH	317 00
36	Bearing Option	4071146	VIS and D	334 00
37	Connecting Link Option	4071755	VIS, D, and PTH	312 00
38	Connecting Link Option	4074709	VIS, D, and PTH	312 00
39	Washer, Key	4076423	RN	-
40	Bearing Option	4063876	VIS	302 00
41	Pin, Augmentor Convergent Nozzle Segment Hinge	4070977	VIS and D	310 00
42	Nozzle Segment, Balance, Augmentor	4070067	VIS, D, and PTH	315 00
43	Lever, Augmentor Nozzle	4074624	VIS and D	311 00
44	Bearing Option	4076383	RN	-
45	Bearing, Plain, Spherical,	4073566	VIS	316 00
46	Connecting Link, Rigid, Balance Nozzle Segment	4073565	VIS and PTH	329 00
47	Seal, Augmentor Balance Nozzle Segment Assembly	4076954	RN	309 00
			Note 1 Replacement only required at scheduled maintenance.	
48	Pin, Straight, Headed, Flat	4033951	VIS and D	309 00
49	Rivet, Blind, Universal	2152845	RN	-
50	Pin, Augmentor Convergent Nozzle Segment	4071726	VIS and D	331 00
51	Lock, Augmentor Convergent Nozzle Segment Cover	4075973	RN	-

Table 1. Augmentor Duct and Nozzle Module Required Scheduled Depot Maintenance (continued)

FIGURE INDEX NUMBER	PART NOMENCLATURE	PART NUMBER	ACTION REQUIRED	T.O. 2J-F100-53-10 WP/SWP AND OTHER REFERENCES
52	Liner, Augmentor Convergent Nozzle Segment Assembly	4070107	VIS and D	313 00
			NOTE 1: Inspect first for worn or missing plasma/thermal barrier coating.	
53	Washer, Flat	4023967	RN	-
54	Pin, Straight, Headed, Flat	4023966	RN	-
		4079434	RN	
55	Seal, Augmentor Convergent Nozzle Segment Assembly	4077837	RN	307 00
			NOTE 1: Replacement only required at scheduled maintenance.	
56	Liner, Augmentor Convergent Nozzle Segment Seal Assembly	4071130	VIS, D, and PTH	308 00
		4078304	VIS, D, and PTH	
			NOTE 1: Inspect first for worn or missing plasma/thermal barrier coating.	

## ACTION CODES

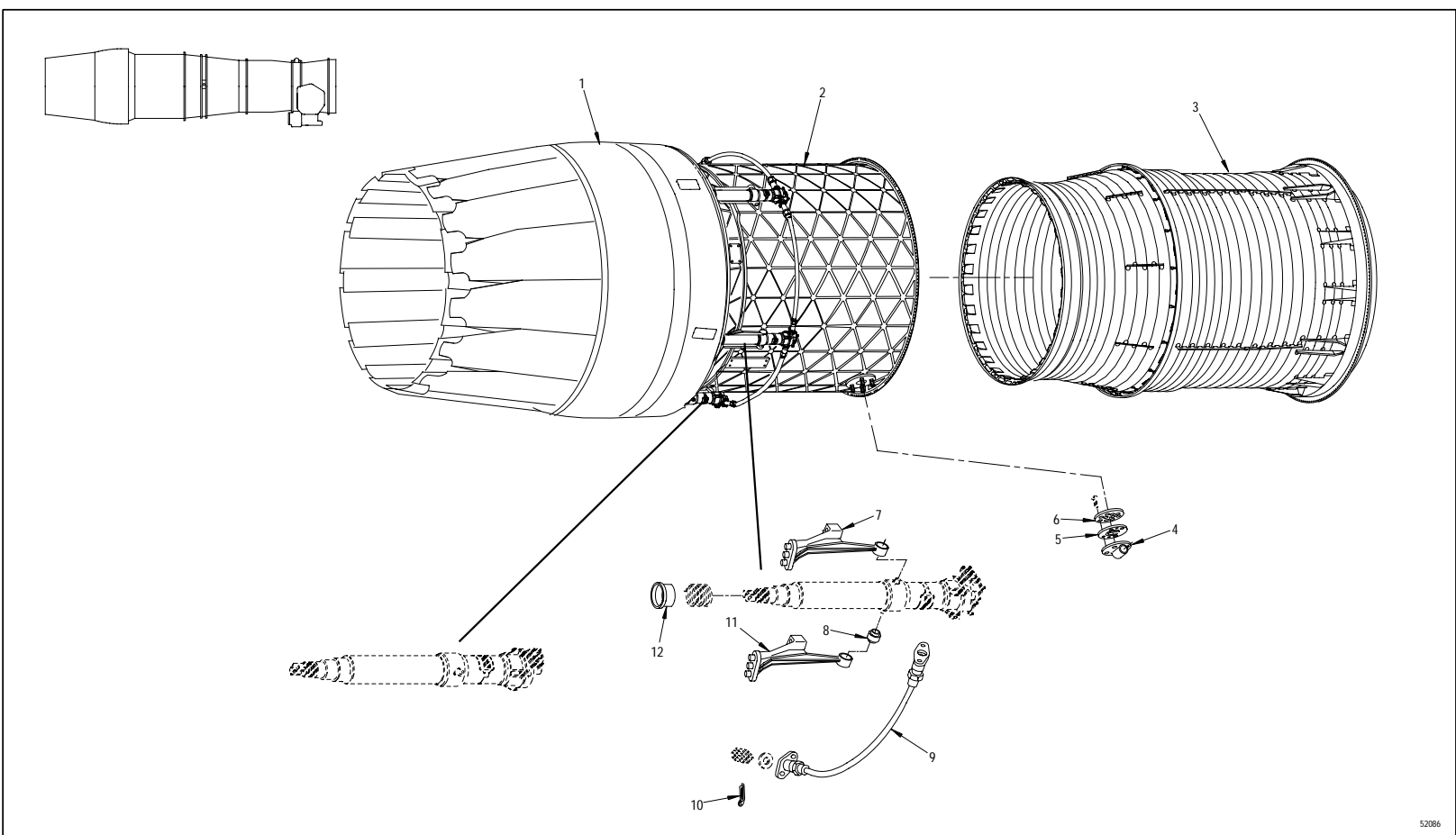
D	- Dimensional inspection
PN	- Part number
PTH	- FPI high sensitivity
RN	- Replace with new part
RW	- Rework part
VIS	- Visual inspection

## 6. FLAMEHOLDER AND SPRAY MANIFOLDS INSPECTION.

- a. Inspect flameholder and spray manifolds. Refer to T.O. 2J-F100-53-5.

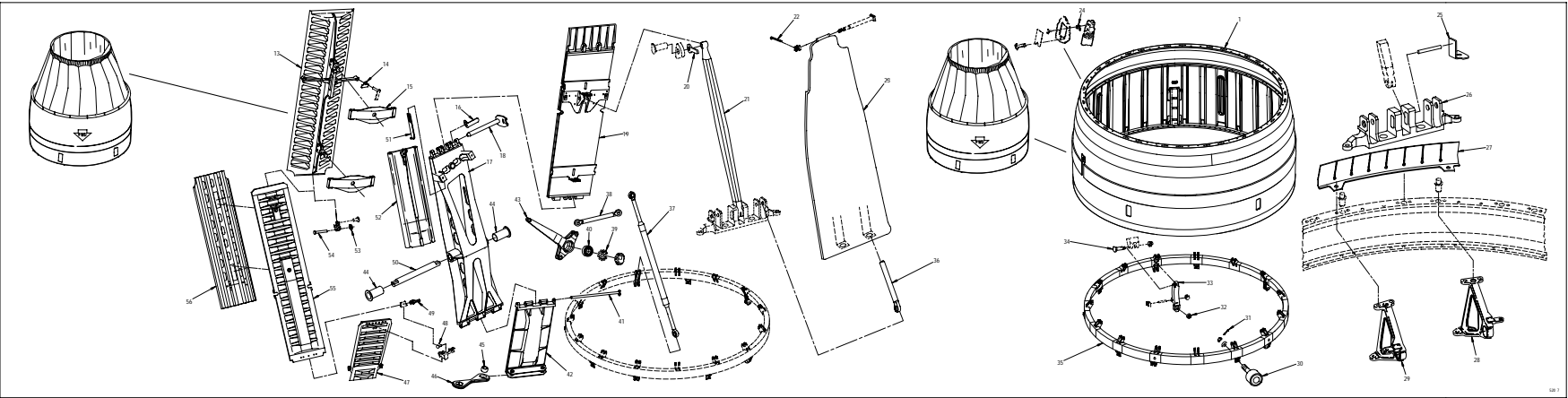






FO-1. Augmentor Duct and Nozzle Module - Scheduled Maintenance (Sheet 1 of 2)





FO-1. Augmentor Duct and Nozzle Module - Scheduled Maintenance (Sheet 2)



**WORK PACKAGE**

**INTRODUCTION**

**UNSCHEDULED MAINTENANCE**

**EFFECTIVITY: ENGINE MODELS F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 2

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 - 2 . . . . .		22			

**1. INTRODUCTION.**

- a. This work package introduces the 020 00 through 099 00 series of work packages for unscheduled maintenance. The following work packages are included:

<b>WP/SWP No.</b>	<b>Title</b>
021 00	Unscheduled Maintenance Plan - General Instructions
022 00	Fuel System Contamination
023 00	Mishap and Dropped Engines Module Damage
024 00	Maintenance Following Chemical Fire Extinguisher Application
025 00	Corrosion, Internal, and External Cleaning
026 00	Foreign Object Damage
027 00	Turbine Distress - Bore Fire
028 00	Oil Consumption, Vertical and Horizontal Maintenance
029 00	Bearing Compartment Vacuum Check Failure
030 00	Chip Detector Particles/JOAP Test Failure
031 00	Fuel Leakage
032 00	Gearbox Start Anomaly
033 00	Augmentor Distress
034 00	Volcanic Ash Ingestion
035 00	Core Engine Module Maintenance After Rejection For Stalls
036 00	PWA 284 Abradable Upgrade for 7th through 12th Stage Compressor Stators With PWA 279 Abradable
037 00	Excessive Engine Vibration Due to Severe Module Distress
038 00 through 099 00	Open

# WORK PACKAGE

## TECHNICAL PROCEDURES

## UNSCHEDULED MAINTENANCE PLAN -

## GENERAL INSTRUCTIONS

EFFECTIVITY: ENGINE MODELS F100-PW-229

This Work Package Supersedes WP 021 00 through and Including Change 4.

### LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4					
					16

REFERENCE MATERIAL REQUIRED

Title	Number
Depot Introduction and General Information - - - - -	T.O. 2J-F100-53-1
General Cleaning Procedures - Descaling, Fuel Manifold Braze Joints (SPOP 220) - - - - -	SWP 031 20
General Cleaning Procedures - Cleaning, Carbon Removal Solution (SPOP 709) - - - - -	SWP 031 21
Depot Core Engine Module - - - - -	T.O. 2J-F100-53-7
Support Bracket, Strap and Actuating Linkage, Bumper and Carriage, Bleed Valve; Elbow and Sleeve, Air Supply Manifold- Inspection - - - - -	WP 349 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None



## 1. INTRODUCTION.

- a. Unscheduled maintenance addresses the entire engine or module. Unscheduled maintenance is required when an engine or module has been removed for operational problems or for failure to pass intermediate maintenance scheduled inspection. It provides troubleshooting guidance and required maintenance to correct problems with minimum amount of disassembly or repair.
- b. Two categories of maintenance (scheduled or unscheduled) are interrelated. When an engine is received for malfunction, scheduled maintenance and unscheduled maintenance may be performed at the same time. Refer to WP 002 00 to determine if scheduled maintenance should be performed with unscheduled maintenance.
- c. Following maintenance actions is required on all depot returns:
  - (1) Post Maintenance testing per paragraph 2.
  - (2) Inspect and refurbish bleed valve strap and actuation linkage.  
Refer to T.O. 2J-F100-53-7, WP 349 00.
- d. Cleaning of fuel manifolds during each depot visit is recommended. If this is not practical, following minimum cleaning requirement shall be applied during processing of engines or modules for OCM.
  - (1) Clean fuel manifolds anytime manifolds are removed for other reasons or causes.  
Refer to T.O. 2J-F100-53-1, SWP 031 20 and SWP 031 21.
  - (2) Clean fuel manifolds anytime combustor or turbine distress exists.  
Refer to T.O. 2J-F100-53-1, SWP 031 20 and SWP 031 21.

**2. POST MAINTENANCE TESTING.**

(See Figure 1.)

- a. Figure 1 outlines minimum test steps required after various maintenance actions which may be encountered at times through Scheduled Maintenance Inspections. These tests should be accomplished as required prior to returning engines to service.

	ENGINE START	CORE RUN-IN	ENGINE TRIM	FUNCTIONAL CHECK
MODULES				
AUGMENTOR	•	-	-	•
CORE - NEW, ZERO TIME (SEE COMPONENTS FOR USED CORES)	•	•	•	-
FAN	•	-	•	-
LOW PRESSURE TURBINE	•	-	•	-
GEARBOX - (NEW, ZERO TIME)	•	-	-	•
GEARBOX - (USED)	•	-	-	•
COMPONENTS (REMOVED OR REPLACED)				
BEARINGS/BEARING COMPARTMENTS (COMPRESSOR, TURBINE, ACCESSORY DRIVE)	•	-	•	-
BLADES - TURBINE	•	•	•	-
CABLES - ELECTRICAL	•	-	-	•
CASES - INLET, INTERMEDIATE, DIFFUSER, TURBINE, EXHAUST	•	-	•	-
COOLER - OIL	•	-	-	-
COMBUSTION CHAMBER	•	-	•	-
CONTROL AND CYLINDER - CIVV	•	-	-	•
CONTROLLER - AUG FUEL PUMP	•	-	-	•
CENC	•	-	-	•
CYLINDERS (ACTUATING) - RCVV START BLEED	•	-	-	•
DUCTS - FAN INNER, FAN OUTER	•	-	-	-
DEEC	•	-	•	-
FILTER - MAIN OIL	•	-	-	-
GENERATOR - STATOR AND/OR ROTOR	•	-	-	-
HIGH PRESSURE COMPRESSOR	•	-	•	-
HIGH PRESSURE COMPRESSOR (NEW ABRADABLE)	•	•	•	-
HIGH PRESSURE TURBINE	•	-	•	-
IGNITION COMPONENTS (MAIN, AUG)	•	-	-	•
NOZZLE - FUEL	•	-	•	-
PROBES - FTIT	-	-	-	-
PROBES P16	-	-	-	-
PROBES T12	-	-	-	-
PUMP - MAIN FUEL	•	-	-	-
PUMP - AUGMENTOR FUEL	•	-	-	•
PUMP - OIL	•	-	-	-
SENSOR - N1	-	-	-	-
TUBES - FUEL, OIL	•	-	-	-
UC	•	-	•	-
VALVE - P&D, ANTI-ICE	•	-	-	-
VANES - TURBINE STATOR	•	-	•	-
31264 (48X1)				

**Figure 1. Post Maintenance Testing**

**WORK PACKAGE****TECHNICAL PROCEDURES****ENGINE FUEL SYSTEM CONTAMINATION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 16

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 - 15 . . . . .	0				
16 Blank . . . . .	0				

## REFERENCE MATERIAL REQUIRED

Title	Number
Engine Test - - - - -	T.O. 2J-F100-11-2
Engine Leak Check Test and Gaspath Inspection - - - - -	WP 302 00
Main Fuel Pump Filter Delta Pressure Check (Pf2-Pf3) - -	WP 527 00
Engine Accessories and Rigging Procedures - - - - -	T.O. 2J-F100-53-4
Pump - Gear, Main Fuel - - - - -	WP 005 00
Control - Fuel, Main - - - - -	WP 009 00
Control - Fuel, Augmentor - - - - -	WP 010 00
Valve - Fuel Pressurizing and Dump - - - - -	WP 011 00
Pump - Fuel, Augmentor - - - - -	WP 013 00
Cooler - Oil - - - - -	WP 028 00
Engine - - - - -	T.O. 2J-F100-53-5
Chamber - Combustion; Nozzles - Fuel; Vanes - Turbine	
Stator, First and Second Stages; Blades - Turbine	
Rotor, First Stage - Fibrescope/Borescope Inspection -	WP 026 00
Blades - Turbine Rotor, Second and Third Stage -	
Borescope Inspection - - - - -	WP 027 00
Duct Assembly, Rear Fan - Disassembly of Parts - - - - -	WP 203 00
Duct Assembly, Rear Fan - Installation of Parts - - - - -	WP 603 00
Core Engine Module - - - - -	T.O. 2J-F100-53-7
Nozzle, Fuel - Removal - - - - -	WP 011 00
Nozzle, Fuel - Installation - - - - -	WP 706 00

Additional required reference material can be found in applicable tables

## APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

## CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, dry, lint-free	-
Fine filter paper	-
Solvent, petroleum	P-D-680, Type II

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

## 1. INTRODUCTION.



Fuel system contamination can cause engine system malfunctions, possibly resulting in operational problems and hot section distress. When contamination is suspected to have originated from the aircraft and is found, inspect the aircraft fuel system and the opposite engine. When test cell contamination is suspected, inspect the previous engine through the test cell.

- a. This work package contains instructions for determining and correcting fuel system contamination.

## 2. CONDITIONS REQUIRING INSPECTION FOR ENGINE FUEL SYSTEM CONTAMINATION.

- a. Inspection for engine fuel system contamination and resultant component maintenance actions shall be performed following any one of the following listed occurrences:

- (1) Augmentor fuel control inlet wash filter is clogged.

- (2) Main fuel control inlet wash filter is clogged.

- (3) Main fuel pump filter is contaminated.

- (4) Main fuel pump filter indicator (red button) is extended (popped).

- (5) Contamination is found in engine fuel system during maintenance or troubleshooting.

- (6) Aircraft or test cell fuel system is contaminated.

- (7) Main fuel pump boost impeller or gear stage has failed.

- (8) Augmentor fuel pump impeller has failed.

- (9) Pressurizing and dump valve leaks.

- b. Perform fuel system contamination inspection per paragraph 3, if any of the above occur.

### 3. ENGINE FUEL SYSTEM INSPECTION FOR CONTAMINATION.

(See Figures 1 through 3 and Tables 1 and 2.)

a. Inspect the main fuel pump filter as follows:

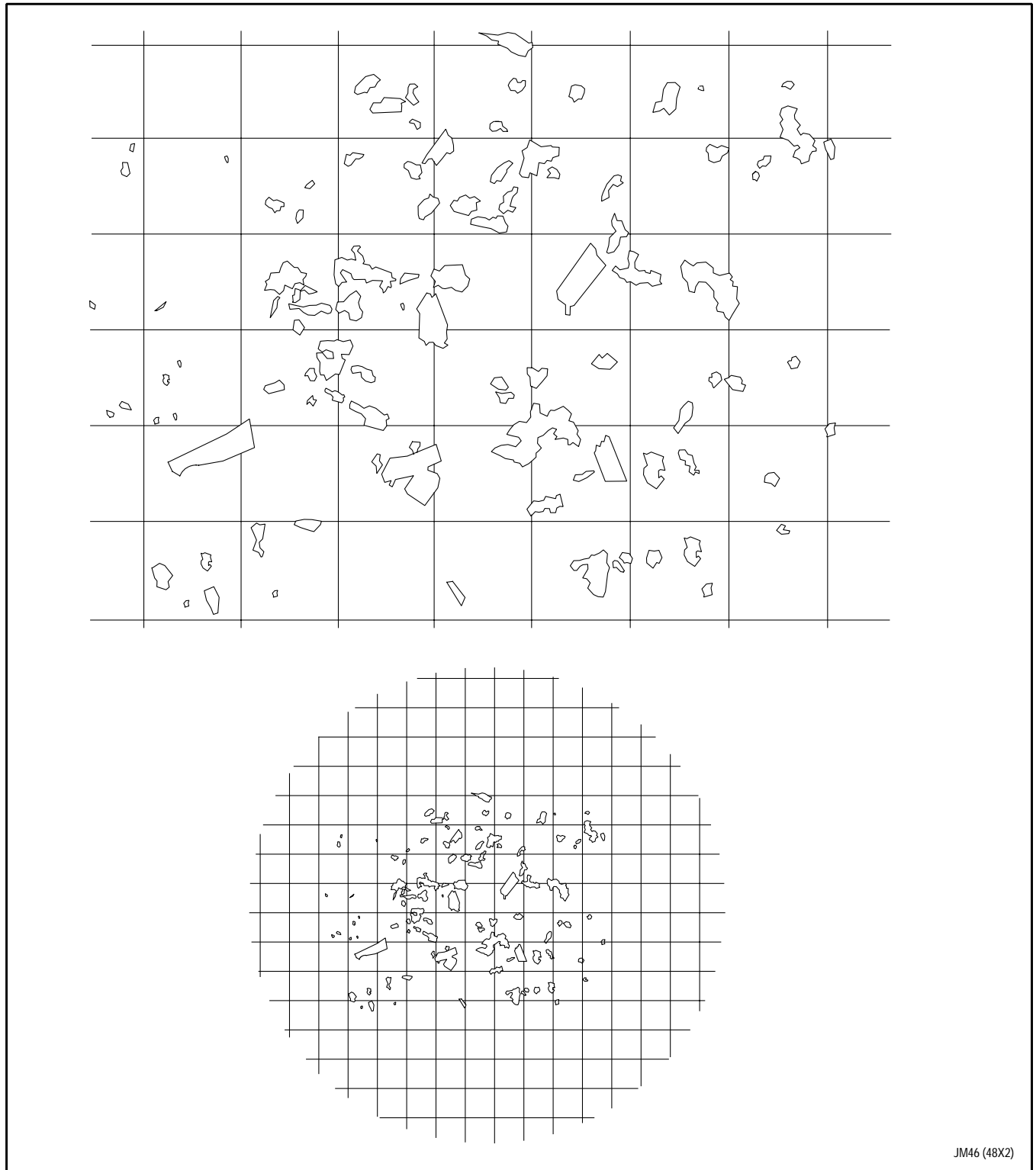
- (1) Note position of fuel filter bypass indicator.
- (2) Remove filter cover from main fuel pump. Refer to T.O. 2J-F100-53-4, WP 005 00.
- (3) Strain fuel from the filter cover through filter paper or clean cloth.

- (4) Determine and take note of the type of contaminant present and estimate percentage of the filter element which is blocked. See figures 1 and 2 and tables 1 and 2.
- (5) Inspect main fuel pump filter assembly. Refer to T.O. 2J-F100-53-4, WP 005 00.
- (6) Clean filter cavity in pump housing and inside of filter cover with P-D-680, Type II petroleum solvent.
- (7) Perform required maintenance on filter and downstream of filter based on filter element assessment in table 2.

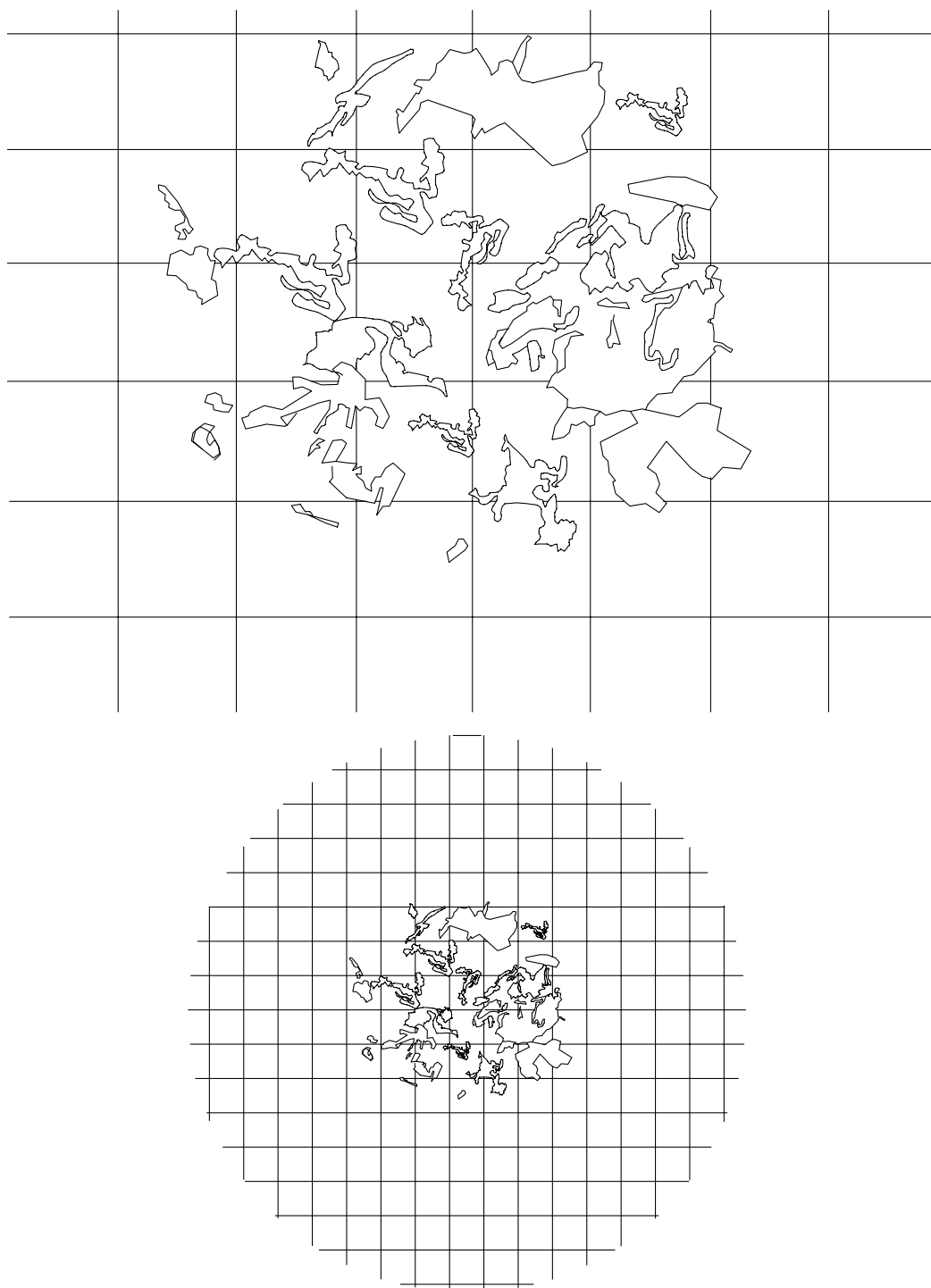
Table 1. Types Of Contamination

Contaminant	Color	Appearance	Possible Sources
<b>Metallic</b>			
Magnetic Steel	Dull or shiny silver	Chips, flakes, or granular	Fuel supply system  Bearings in main fuel control, augmentor fuel control and main fuel pump Main fuel pump gears
Nonmagnetic-Aluminum	Dull or shiny silver	Chips, flakes, or granular	Fuel supply system  MFP boost stage impeller Housings of main fuel control, augmentor fuel control, and main fuel pump
Bronze	Dull or shiny gold	chips, flakes, or granular	Main fuel pump bearings  Fuel supply system
<b>Nonmetallic</b>			
Rubber	Various	Various	Fuel supply system Ingested caps
Plastic	Various	Various	Fuel supply system Ingested caps
Carbon	Blank	Granular, chips	Fuel manifolds or tubes Fuel supply system
Fibrous	Various	Fuzzy	Fuel supply system Ingested rags
Fungus	Off-white	Gelatinous	Water contaminated fuel
Sand, dirt	Various	Granular	Fuel supply system





**Figure 1. Contamination Consisting of Random Materials**



JM47 (48X2)

**Figure 2. Contamination Consisting of Common Materials**

**Table 2. Main Fuel Pump Filter Inspection Procedure**

Condition Found	Maintenance Required	T.O./WP Reference
<b>NOTE</b>		
If main fuel gear pump filter indicator button is extended, use the table below to determine required maintenance actions.		
1. No Contamination	a. Install new packings in filter element and new packing in filter cover. Reinstall filter element. b. Perform engine leak check test and ensure indicator button does not re-extend. c. If indicator button extends, replace pump filter cover. d. If indicator button does not extend, return engine to service.	a. T.O. 2J-F100-53-4, WP 005 00  b. T.O. 2J-F100-11-2, WP 302 00  c. T.O. 2J-F100-53-4, WP 005 00
2. Metallic Contamination	a. Determine source of contamination. (See table 1.) b. Replace the following components. (1) Replace main fuel control.  (2) Replace augmentor fuel control. (3) Replace oil cooler.  (4) Replace main fuel pump.  (5) Replace pressurizing and dump valve. (6) Flush all fuel lines between engine fuel filter and fuel nozzles. (7) Replace all fuel nozzles.  (8) Borescope 1st and 2nd stage turbine vanes.	(1) T.O. 2J-F100-53-4, WP 009 00 (2) T.O. 2J-F100-53-4, WP 010 00 (3) T.O. 2J-F100-53-4, WP 028 00 (4) T.O. 2J-F100-53-4, WP 005 00 (5) T.O. 2J-F100-53-4, WP 011 00 (6) T.O. 2J-F100-53-5, WP 061 00  (7) T.O. 2J-F100-53-7, WP 706 00 (8) T.O. 2J-F100-53-5, WPs 026 00 and 027 00

Table 2. Main Fuel Pump Filter Inspection Procedure (continued)

Condition Found	Maintenance Required	T.O./WP Reference
3. Nonmetallic Contamination	a. Determine source of contamination. (See table 1.) b. Determine extent of contamination by performing inspection procedures in figure 3. Replace components as required. c. Flush all fuel lines between pump fuel filter and fuel nozzles. d. Replace all fuel nozzles. e. Replace main fuel pump filter element.	d. T.O. 2J-F100-53-5, WPs 128 00 and 129 00 e. T.O. 2J-F100-53-4, WP 005 00

**NOTE**

If main pump fuel filter indicator button is not extended (popped), use table below to determine required maintenance action.

4. No Contamination	a. Reinstall main fuel pump filter element. b. Return engine to service.	a. T.O. 2J-F100-53-4, WP 005 00
5. Metallic Contamination	a. If metallic contamination consists of small quantities (less than 100 pieces) of random material as in figure 1, replace main fuel pump filter element. b. If metallic contamination consists of: (1) Large quantities of common materials as in figure 2 (2) Recognizable pieces of hardware (ie bolts, washers, pins, springs, etc) (3) Bronze chips, flakes, or granules.	a. T.O. 2J-F100-53-4, WP 005 00

Table 2. Main Fuel Pump Filter Inspection Procedure (continued)

Condition Found	Maintenance Required	T.O./WP Reference
5. Metallic Contamination (continued)	c. Then:  (1) Determine source of contamination. (See table 1.) (2) Determine extent of contamination of augmentor fuel supply system. (See figure 3.) d. Replace main fuel pump filter element.	d. T.O. 2J-F100-53-4, WP 005 00
6. Nonmetallic Contamination	a. Determine source of contamination. (See table 1.) b. Replace main fuel pump filter element.	b. T.O. 2J-F100-53-4, WP 005 00

b. Inspect all plumbing lines, component inlets and component outlets shown in figure 3 which are located downstream of contamination source. If contamination source is unknown, inspect all components in figure 3.

(1) Inspect plumbing lines as follows:

(a) Disconnect line to be inspected. Catch drained fuel in clean container and visually examine fuel for contaminants.

(b) If contaminants are present, strain fuel through clean cloth.

(c) Determine and take note of type, location, and approximate quantity of contaminants found.

(d) Clean tube by alternately flushing tube with cleaning solvent and blowing low pressure air through tube. No contaminant should be present when drained solvent is strained through a clean cloth.

(2) Inspect components as follows:

(a) Visually inspect component inlets and outlets.

(b) Carefully remove contaminants caught in inlet screens.

(c) Determine and take note of type, location, and approximate quantity of contaminants removed.

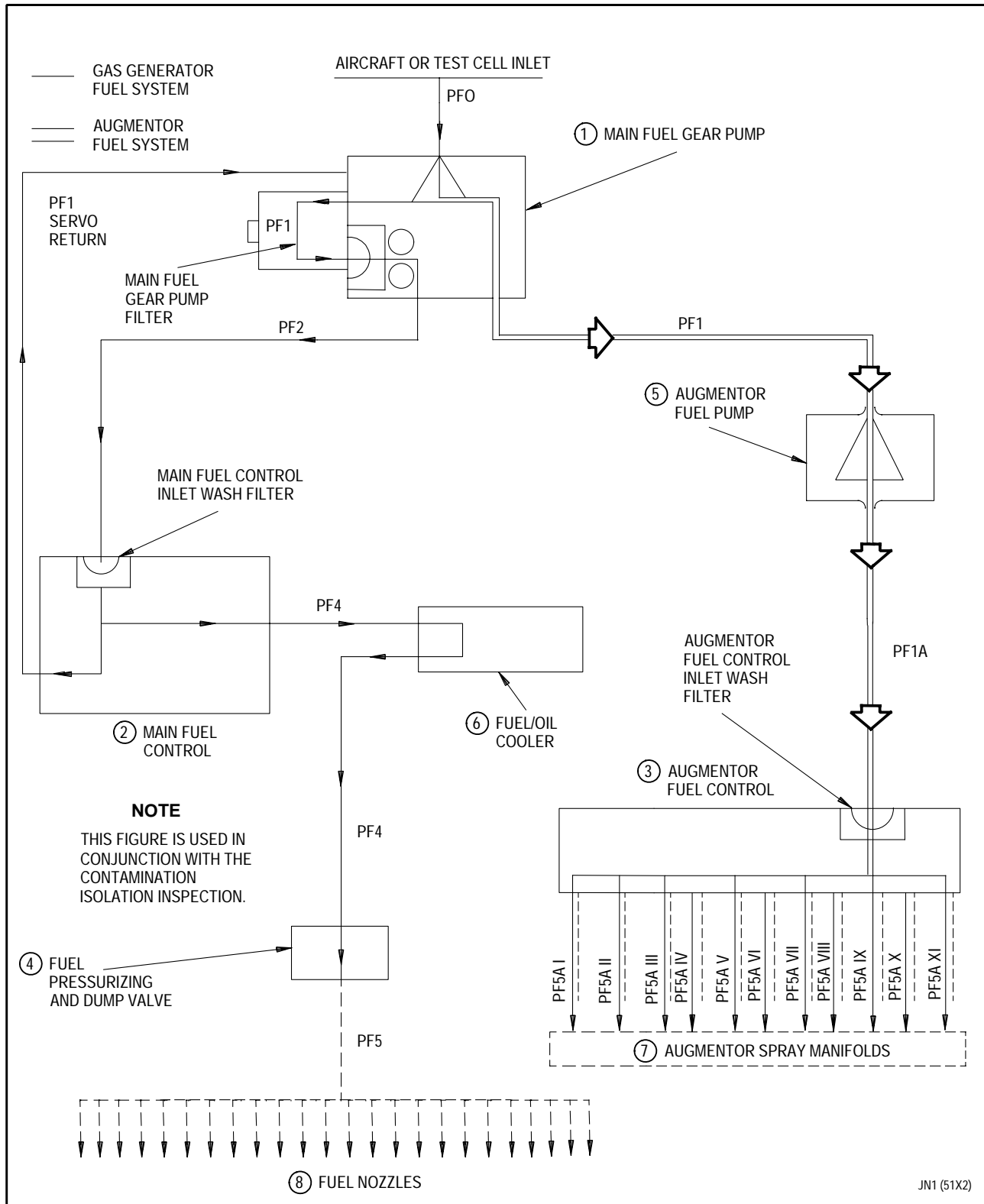


Figure 3. Fuel System Plumbing Lines and Component Inlets and Outlets

**Legend for figure 3**

<b>Step</b>	<b>Component</b>	<b>Inspection Area</b>	<b>If Contamination Present, Maintenance Action Required</b>
1.	Main Fuel Gear Pump	Inlet (Pfo) Outlet (Pf1) Outlet (Pf2)	See table 3.
2.	Main Fuel Control	GG inlet (Pf2/GG wash filter) GG outlet (Pf4)	If metallic contaminant found in Pf2 or Pf4 ports, replace main fuel control. Refer to T.O. 2J-F100-53-4, WP 009 00.
3.	Augmentor Fuel Control	Augmentor inlet (Pf1a/Augmentor wash filter) Augmentor outlet (Pf5a/Spray manifolds)	If metallic contaminant was found in augmentor filter, replace main fuel control, augmentor fuel pump, and oil cooler. Refer to T.O. 2J-F100-53-4, WPs 009 00, 013 00, and 028 00. Also, replace augmentor spray manifolds. Refer to T.O. 2J-F100-53-5, WP 603 00.
4.	Fuel Pressurizing and Dump Valve	Outlet (Pf4)	If contamination is found, replace fuel pressurizing and dump valve. Refer to T.O. 2J-F100-53-4, WP 011 00.
5.	Augmentor Fuel Pump	Inlet (Pf1) Outlet (Pf1a)	If contamination is found, replace augmentor fuel pump. Refer to T.O. 2J-F100-53-4, WP 013 00.
6.	Oil cooler	Inlet (Pf4) Outlet (Pf4)	If contamination is found, replace oil cooler. Refer to T.O. 2J-F100-53-4, WP 028 00.

## Legend for figure 3 (continued)

Step	Component	Inspection Area	If Contamination Present, Maintenance Action Required
7.	Augmentor Spray Manifolds	Inlet (Pf5a 1-11)	If metallic contaminant found, replace augmentor spray manifolds. Refer to T.O. 2J-F100-53-5, WP 603 00. Also, replace augmentor fuel control. Refer to T.O. 2J-F100-53-4, WP 010 00.
8.	Fuel Nozzles	Inlet (Pf5)	If contaminant is found, replace fuel nozzles. Refer to T.O. 2J-F100-53-7, WP 706 00.

#### 4. MAINTENANCE ACTIONS REQUIRED ON COMPONENTS.

(See figures 1 and 2.)

- a. Disposition components based on contamination found during engine fuel system inspection as follows:

- (1) When contamination consists of random materials with non-uniform sizes (figure 1), which do not appear to originate from a common source, no component removal is required.

- (2) When contamination contains a common material, with multiple pieces of similar size and appearance (figure 2), which appear to have originated from a common source, component disposition is based on the following:

- (a) If contamination consists of metallic material, sand, or abrasives replace the following:

Component	T.O./WP Reference
• augmentor fuel pump	T.O. 2J-F100-53-4, WP 013 00
• augmentor spray manifolds	T.O. 2J-F100-53-5, WP 603 00
• main fuel gear pump	T.O. 2J-F100-53-4, WP 005 00
• main fuel control	T.O. 2J-F100-53-4, WP 009 00
• P&D valve	T.O. 2J-F100-53-4, WP 011 00
• oil cooler	T.O. 2J-F100-53-4, WP 028 00
• augmentor fuel control	T.O. 2J-F100-53-4, WP 010 00



- (b) If contamination consists of paper, plastic, or fibrous material and less than 30% blockage of main fuel pump filter and component inlet screens, clean fuel section of oil cooler. Alternately flush cleaning solvent, and blow low pressure air through main fuel control inlet and outlet ports. Repeat procedure until no contamination is apparent when straining cleaning solvent through clean cloth.
- (c) If contamination consists of paper, plastic, or fibrous material and more than 30% of main fuel pump filter or component inlet screens are blocked, replace the following:
- Main fuel control
  - Oil cooler
- (d) If contamination consists of rubber material, flush the oil cooler per step a.(2)(b).
- b. Inspect main fuel pump filter after shutdown from the initial engine run, following compliance with the above contamination procedures. This will ensure that the fuel system has been thoroughly flushed, and contamination source has been correctly identified and eliminated.



**WORK PACKAGE****TECHNICAL PROCEDURES****MISHAP AND DROPPED ENGINES MODULE DAMAGE****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 6

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 - 5 . . . . .	0				
6 Blank . . . . .	0				

## REFERENCE MATERIAL REQUIRED

Title	Number
Engine Test - - - - -	T.O. 2J-F100-11-2
Engine Vibration Analysis - - - - -	WP 218 00
Engine - - - - -	T.O. 2J-F100-53-5
Borescope Inspection - Equipment and Operation - - - - -	WP 021 00
Blades, Compressor Rotor, Second, and Third Stages Borescope Inspection - - - - -	WP 022 00
Blades - Compressor Rotor, Fourth Stage; Vanes -Inlet Variable, Rear Compressor Stator; Fairing - Proximate Splitter, Compressor Intermediate Case - Borescope Inspection - - - - -	WP 023 00
Blades, Compressor Rotor, Sixth, Seventh, and Eighth Stages; Borescope Inspection - - - - -	WP 024 00
Blades, Compressor Rotor, Twelfth, and Thirteenth Stages, Borescope Inspection - - - - -	WP 025 00
Chamber - Combustion; Nozzles - Fuel; Vanes -Turbine Stator, First and Second Stages; Blades - Turbine Rotor First Stage Fibrescope/BorescopeInspection - - - - -	WP 026 00
Blade - Turbine Rotor, Second, and Third Stages Borescope Inspection - - - - -	WP 027 00
Duct Assembly, Fan, Outer Front Inspection - - - - -	WP 425 00
Duct Assembly, Fan, Rear Inspection - - - - -	WP 426 00
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Vane, Front Compressor Stator Variable; Inlet Bearing, Compressor Stator; Shroud BearingCompressor Stator; and Inlet Bolts -Inspection - - - - -	WP 312 00
Augmentor Duct and Nozzle Module - - - - -	T.O. 2J-F100-53-10
Inspection - General - - - - -	WP 301 00

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

**1. INTRODUCTION.**

- a. This work package contains instructions for the inspection and corrective action to be performed on engines or modules damaged by mishap or dropped during handling.

**2. MISHAP OR DROPPED ENGINE OR MODULE - DAMAGE CLASSIFICATION.**

- a. Inspection and corrective action is listed in three categories as follows:
  - (1) Class A Mishap Damage.  
Engines involved in a Class A mishap cannot be reused. Any investigation will be directed by the Accident Investigation Board.
  - (2) Class B and C Mishap Damage.  
Corrective action consists of replacement of all damaged parts followed by functional checks.
  - (3) Dropped Engines or Modules.  
Corrective action consists of replacement of all damaged parts and engine functional checks.

**3. MISHAP OR DROPPED ENGINE OR MODULE - DAMAGE MAINTENANCE ACTIONS.**

- a. Perform maintenance actions as follows:
  - (1) Class A Mishap Damage.  
Teardown, investigation, and disposition of engines will be at the direction of the Accident Investigation Board.
  - (2) Class B and C Mishap and Dropped Engine or Modules.
    - (a) Visually inspect external engine. Replace any damaged parts.
    - (b) Perform borescope or fibrescope inspection. Refer to T.O. 2J-F100-53-5, WPs 021 00 through WP 027 00. Particularly check for excessive rotor rub and obvious damage. If indications of excessive rotor rub or other damage is found, disassemble module to repair.
    - (c) Visually inspect fan inlet case struts for cracks. Refer to T.O. 2J-F100-53-6, WP 312 00.

- (d) Visually inspect front fan duct exterior. Refer to T.O. 2J-F100-53-5, WP 425 00 for cracks and buckling in duct skin. Pay particular attention to areas adjacent to right and left side bleed ports.
- (e) Visually inspect rear fan duct exterior. Refer to T.O. 2J-F100-53-5, WP 426 00 for cracks and buckling in duct skin. Pay particular attention to areas adjacent to rear mount ring in rear of engine/aircraft attachment.
- (f) Visually inspect augmentor duct. Refer to T.O. 2J-F100-53-10, WP 301 00 for cracks and buckling.
- (g) Perform engine primary and secondary functional checks. Check for excessive vibration and performance deterioration. Refer to T.O. 2J-F100-11-2, WP 218 00.





**WORK PACKAGE**

**TECHNICAL PROCEDURES**

**MAINTENANCE FOLLOWING CHEMICAL FIRE EXTINGUISHER APPLICATION**

**EFFECTIVITY: ENGINE MODEL F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 4

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 - 3 . . . . .	0				
4 Blank . . . . .	0				

REFERENCE MATERIAL REQUIRED

Title	Number
On Condition Maintenance - - - - -	T.O. 2J-F100-53-2
Corrosion, Internal, and External Cleaning - - - - -	WP 025 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package describes the corrective action to be performed on an engine, module, or hardware returned to depot because of chemical fire extinguisher application.

**2. CORROSION INSPECTION.**

- a. Complete disassembly and maintenance is required for engines, modules, or hardware having been exposed to corrosive chemical fire extinguisher per WP 025 00.
- b. Expedite required maintenance to minimize exposure of hardware to corrosive agents.



# WORK PACKAGE

## TECHNICAL PROCEDURES

### CORROSION, INTERNAL, AND EXTERNAL CLEANING

EFFECTIVITY: ENGINE MODEL F100-PW-229

## LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
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1 - 4					0
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REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Descaling, Fuel Manifold Brazed Joints (SPOP 220) - - - -	SWP 031 20
On Condition Maintenance - - - - -	T.O. 2J-F100-53-2
Maintenance Following Chemical Fire Extinguisher Application - - - - -	WP 024 00
Core Engine Module - - - - -	T.O. 2J-F100-53-7
Core Engine Module Parts Cleaning - - - - -	WP 201 00
Support Bracket, Strap and Actuating Linkage, Bumper and Carriage; Bleed Valve - - - - -	WP 349 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package describes the corrective action to be performed on engines, modules, and individual hardware with internal or external corrosion.
- b. Corrective action consists of removal, cleaning, inspection, and installation of affected parts.

**2. ENGINES/MODULES RETURNED BECAUSE OF INTERNAL OR EXTERNAL CORROSION.****NOTE**

- These engines/modules require complete disassembly, cleaning, inspection, and reassembly. Refer to applicable manuals of T.O. 2J-F100-53 depot manual set.
  - The most likely cause of severe internal or external corrosion is failure to perform adequate maintenance following application of chemical fire extinguisher per WP 024 00.
- a. If part inspection, after cleaning, reveals surface pitting or other damage from corrosion, part shall be rejected unless inspection section for that specific part allows condition seen.

**3. LOCALIZED CORROSION SEEN ON  
ENGINES OR MODULES RETURNED TO DEPOT  
FOR OTHER CAUSES.**

**NOTE**

Any corroded part not removed during maintenance for other causes, is to be removed and serviced per appropriate work packages. These may be located as outlined in paragraph 2.

- a. Clean main fuel supply manifolds. Refer to T.O. 2J-F100-53-1, SWP 031 20.

- b. Service bleed valve strap and actuation linkage. Refer to T.O. 2J-F100-53-7, WP 349 00.

- c. Corroded hardware noted during disassembly for other causes should receive routine cleaning and inspection as specified in the applicable work packages.



**WORK PACKAGE**

**TECHNICAL PROCEDURES**

**FOREIGN OBJECT DAMAGE**

**EFFECTIVITY: ENGINE MODEL F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 10

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 - 9 . . . . .	0				
10 Blank . . . . .	0				

**REFERENCE MATERIAL REQUIRED**

Required reference material can be found in applicable tables.

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

## 1. INTRODUCTION.

- a. This work package contains guidelines for the inspection, maintenance, and repair of engine modules that contain Foreign Object Damage (FOD).
- b. Corrective action consists of:
  - (1) Assessing individual module damage with borescope.
  - (2) Removing affected modules.
  - (3) Replacing or repairing damaged parts.

(4) Assembling for return to service.

- c. Optional vertical and horizontal maintenance instructions for engine and fan are provided.

## 2. FOREIGN OBJECT DAMAGE, VERTICAL, AND OPTIONAL HORIZONTAL MAINTENANCE.

(See Table 1.)

- a. See table 1 for FOD, vertical, and optional horizontal maintenance.

Table 1. Foreign Object Damage, Vertical and Optional Horizontal Maintenance

Engine/Module	Area/Task	T.O./WP Reference	Remarks
1. Engine	<p>a. Inspect modules by borescoping to determine which modules have FOD and require repair.</p> <p>b. Disassemble affected modules.</p> <p>c. Repair modules.</p> <p>d. When inspection and repair is completed, install modules.</p>	<p>a. T.O. 2J-F100-53-5, WPs 021 00 through 027 00</p> <p>b. T.O. 2J-100-53-5, WPs 101 00 through 110 00, and 112 00, 131 00 and 132 00.</p> <p>c. (Refer to steps 2 through 5.)</p> <p>d. T.O. 2J-F100-53-5, WPs 703 00, through 707 00, 709 00, 719 00 through 724 00, 727 00, and 732 00.</p>	

**NOTE**

Match-marking parts will expedite assembly and maintain dynamic balance if all parts are reused.

2. Fan module	<p>a. Disassemble and mark rotor (disks, air seals, etc) as disassembly progresses. Fan may be assembled with parts in same relative positions, as before.</p>	<p>a. T.O. 2J-F100-53-6, WPs 011 00 through 014 00</p>	
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Table 1. Foreign Object Damage, Vertical and Optional Horizontal Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
2. Fan module (continued)	b. Inspect and repair fan blades, cases, stators, and air seals.	b. T.O. 2J-F100-53-6, WPs 310 00 through 321 00, 324 00, 411 00, 412 00, 415 00, 418 00, and 425 00	
	c. Assemble fan module with serviceable parts.	c. T.O. 2J-F100-53-6, WPs 701 00 through 705 00	

**NOTE**

Match-mark compressor rotor parts (disks, air seals, etc) to expedite assembly and maintain dynamic balance if all parts are reused.

3. Core module	a. Disassemble and match-mark core. If there was no damage seen at borescoping on 8th, 12th, or 13th stage blades, do not disassemble past the 7th stage. This will conserve consumable parts and hours.	a. T.O. 2J-F100-53-7, WP 014 00
	b. Inspect compressor blades and blend as required.	b. T.O. 2J-F100-53-7, WP 374 00
	(1) If damage is found on 12th or 13th stage blades, inspect front No. 4 bearing air seal.	(1) T.O. 2J-F100-53-7, WP 334 00.

Table 1. Foreign Object Damage, Vertical and Optional Horizontal Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
3. Core module (continued)	<p>c. If rear compressor has broken blade with damage indication at fracture face (typical of FOD), proceed as follows:</p> <p>(1) Inspect all blades in stage with broken blade.</p> <p>(2) Inspect drum rotor.</p> <p>(3) Inspect two adjacent stator assemblies.</p> <p>(4) Inspect No. 4 bearing compartment for foreign objects damage.</p> <p>(5) Parts acceptable to these inspections may be reused.</p> <p>d. If rear compressor has broken blade and no apparent damage to fracture face, proceed as follows:</p> <p>(1) Inspect blades; blades acceptable to this inspection may be reused.</p>	<p>(1) T.O. 2J-F100-53-7, WP 374 00</p> <p>(2) T.O. 2J-F100-53-7, WPs 302 00, 305 00 and 361 00</p> <p>(3) T.O. 2J-F100-53-7, WPs 354 00 and 355 00</p> <p>(1) T.O. 2J-F100-53-7, WP 374 00</p>	

Table 1. Foreign Object Damage, Vertical and Optional Horizontal Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
3. Core module (continued)	e. If one or both are variable vane stages, check for disconnected or misindexed vane arms.	e. T.O. 2J-F100-53-7, WP 357 00	
	f. Inspect stators, vanes, and cases.	f. T.O. 2J-F100-53-7, WPs 321 00, 348 00, 351 00, 357 00, 360 00, 364 00, 368 00, 369 00, 370 00, and 375 00	
	g. Visually inspect drum rotor.	g. T.O. 2J-F100-53-7, WPs 302 00 and 361 00	
	h. There is no need to remove blades from disk(s) except for replacement.	h. T.O. 2J-F100-53-7, WP 014 00	
	i. If 1st stage turbine vanes have to be removed, remove and install.	i. T.O. 2J-F100-53-7, WPs 011 00 and 706 00	
	j. Assemble rear compressor with serviceable parts.	j. T.O. 2J-F100-53-7, WP 706 00	

Table 1. Foreign Object Damage, Vertical and Optional Horizontal Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
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## NOTE

Match-mark compressor rotor parts (disks, air seals, etc) to expedite assembly and maintain dynamic balance if all parts are reused.

4. Rear compressor drive turbine module	a. Disassemble and mark rear compressor drive turbine as disassembly progresses. Rear compressor drive turbine may be assembled with parts in same relative position, as before.	a. T.O. 2J-F100-53-8, WP 011 00
	b. Inspect blades, vanes, and disks.	b. T.O. 2J-F100-53-8, WP 303 00, 304 00, 308 00, 310 00, and 311 00
	c. Repair.	
	d. Replace blades as necessary.	d. TO. 2J-F100-53-8, WP 021 00 through 023 00, and 601 00
	e. Assemble and balance using serviceable parts.	e. T.O. 2J-F100-53-8, WPs 701 00 702 00



Table 1. Foreign Object Damage, Vertical and Optional Horizontal Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
<b>NOTE</b>			
Match-mark turbine rotor (disks, air seals, etc) to expedite assembly and maintain dynamic balance if all parts are reused.			
5. Fan drive turbine module	a. Disassemble and mark fan drive turbine as disassembly progresses. Fan drive turbine may be assembled with parts in same relative position, as before.	a. T.O. 2J-F100-53-9, WPs 012 00, 021 00 through 023 00, 027 00, and 028 00	
	b. Inspect blades, vanes, and disks.	b. T.O. 2J-F100-53-9, WPs 306 00, 307 00, 312 00, 313 00, 314 00, and 322 00	
	c. Repair.	c. T.O. 2J-F100-53-9, WPs 406 00, 407 00 412 00, 413 00, 414 00, and 422 00	
	d. Assemble and balance fan drive turbine with serviceable parts.	d. T.O. 2J-F100-53-9, WPs 602 00 through 605 00, 611 00, and 701 00	



**WORK PACKAGE**

**TECHNICAL PROCEDURES**

**TURBINE DISTRESS - BORE FIRE**

**EFFECTIVITY: ENGINE MODEL F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 12

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 . . . . .	15	7 . . . . .	15	8 - 12 . . . . .	0
2 - 6 . . . . .	0				

**REFERENCE MATERIAL REQUIRED**

Required reference material can be found in applicable tables.

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

**1. INTRODUCTION**

- a. This work package describes inspection and corrective action needed for engines or core modules returned to depot for No. 4 compartment oil leakage or a suspect bore oil fire.

**2. TURBINE DISTRESS - BORE FIRE.**

(See Figures 1 through 4 and Table 1.)

- a. Determine if a bore fire has occurred. See table 1 and figures 1 through 4.

Table 1. Turbine Distress - Bore Fire

Module/Engine	Area/Module Task	T.O./WP References	Remarks
1. Disassemble engine	a. Remove augmentor duct and nozzle module.	a. T.O. 2J-F100-53-5, WP 101 00	
	b. Remove rear outer fan duct.	b. T.O. 2J-F100-53-5, WP 107 00	
	c. Remove fan drive turbine module.	c. T.O. 2J-F100-53-5, WP 131 00	
2. Disassemble core module	a. Remove high pressure turbine.	a. T.O. 2J-F100-53-7, WP 011 00	
	b. Remove combustor, TOBI, and 1st nozzle guide vane package.	b. T.O. 2J-F100-53-7, WP 011 00	

**NOTE**

- Evidence of oil leakage from No. 4 bearing compartment, supply or scavenge plumbing, requires inspection for heat distress.
- Any indication of burning or evidence of heat distress on any of parts inspected indicates an oil fire.
- Due to disk material structure, a bore fire can do extensive over temperature damage to turbine disks which is not detectable by metallographic examination of disk.
- Therefore, parts adjacent to disks which are made of different materials shall be examined to determine extent of damage incurred to disks.

Table 1. Turbine Distress - Bore Fire (continued)

Module/Engine	Area/Module Task	T.O./WP References	Remarks
3. Inspection at module level	<p>a. Inspect No. 4 bearing compartment housing and heat shields for burning.</p> <p>b. Inspect boreseal for burning or erosion.</p> <p>c. Inspect rear compressor drive turbine nut for overtemperature discoloration and knife edge seal burning or erosion.</p> <p>d. Inspect 2nd stage disk balance weight flange for burning.</p> <p>e. Inspect rear compressor turbine hub for evidence of discoloration/ overtemperature condition.</p> <p>f. Inspect rear compressor driveshaft at hole location in turbine hub for discoloration/ overtemperature.</p> <p>g. Disassemble and inspect No. 4 bearing compartment in order to determine and correct source of oil leakage.</p>	<p>g. T.O. 2J-F100-53-2, WP 028 00.</p>	<p>a. See item 1, figure 1.</p> <p>b. See item 2, figure 1.</p> <p>c. See item 3, figure 1.</p> <p>d. See item 4, figure 1</p> <p>e. See item 10, figure 1.</p> <p>f. See item 11, figure 1.</p>

Table 1. Turbine Distress - Bore Fire (continued)

Module/Engine	Area/Module Task	T.O./WP References	Remarks
4. Disassemble rear compressor drive turbine	a. Unstack rotor and stator assembly.  b. Service cycle markings shall be applied to all parts.	a. T.O. 2J-F100-53-8, WP 011 00 and 021 00  b. T.O. 2J-F100-53-8, WPs 022 00 and 023 00	
5. Disassemble fan drive turbine module.	a. Unstack rotor and stator assembly.	a. T.O. 2J-F100-53-9, WP 021 00	
6. Core and fan drive turbine modules inspection.	a. Perform core and fan drive turbine module inspections. See figures 1 through 4.		a. Use PWA 55851 inspection photographs for microstructure comparison.

**NOTE**

If only core was returned to depot, and a bore oil fire has occurred, then field shall be notified to return fan drive turbine to depot for bore fire inspection.

7. Part disposition	a. All parts found to be over- temperatured shall be replaced.	
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Table 1. Turbine Distress - Bore Fire (continued)

Module/Engine	Area/Module Task	T.O./WP References	Remarks
8. Assembly	a. Assemble rear compressor drive turbine.	a. T.O. 2J-F100-53-8, WPs 601 00 and 701 00	
	b. Assemble front compressor drive turbine.	b. T.O. 2J-F100-53-9, WPs 611 00 and 701 00	
9. Core assembly	a. Install 1st stage stator vanes and 1st stage turbine ring and support assembly.	a. T.O. 2J-F100-53-7, WP 706 00	
	b. Install high pressure turbine assembly.	b. T.O. 2J-F100-53-7, WP 706 00	
10. Engine assembly	a. Join fan drive turbine assembly to engine.	a. T.O. 2J-F100-53-5, WP 705 00	
	b. Install rear outer fan duct.	b. T.O. 2J-F100-53-5, WP 707 00	
	c. Install augmentor duct and nozzle assembly.	c. T.O. 2J-F100-53-5, WP 727 00	
11. Main fuel control	a. Remove main fuel control.	a. T.O. 2J-F100-53-2, WP 009 00	
	b. Return main fuel control to depot shop tagged for PLA shaft replacement.		
	c. Install serviceable main fuel control.		



**Legend for figure 1**

1. No. 4 Bearing Compartment Housing Heat Shields
2. Boreseal Assembly
3. Rear Compressor Turbine Nut
4. 2nd Stage Turbine Disk Balance Weight Flange
5. 3rd Stage Turbine Air Sealing Ring Assembly
6. 1st Stage Turbine Disk
7. 2nd Stage Turbine Disk
8. 3rd Stage Turbine Disk
9. 3rd Stage Turbine Air Seal
10. Hub Assembly, Turbine Rear Compressor
11. Rear Compressor Driveshaft
12. 4th Stage Turbine Disk
13. Turbine Rear Hub

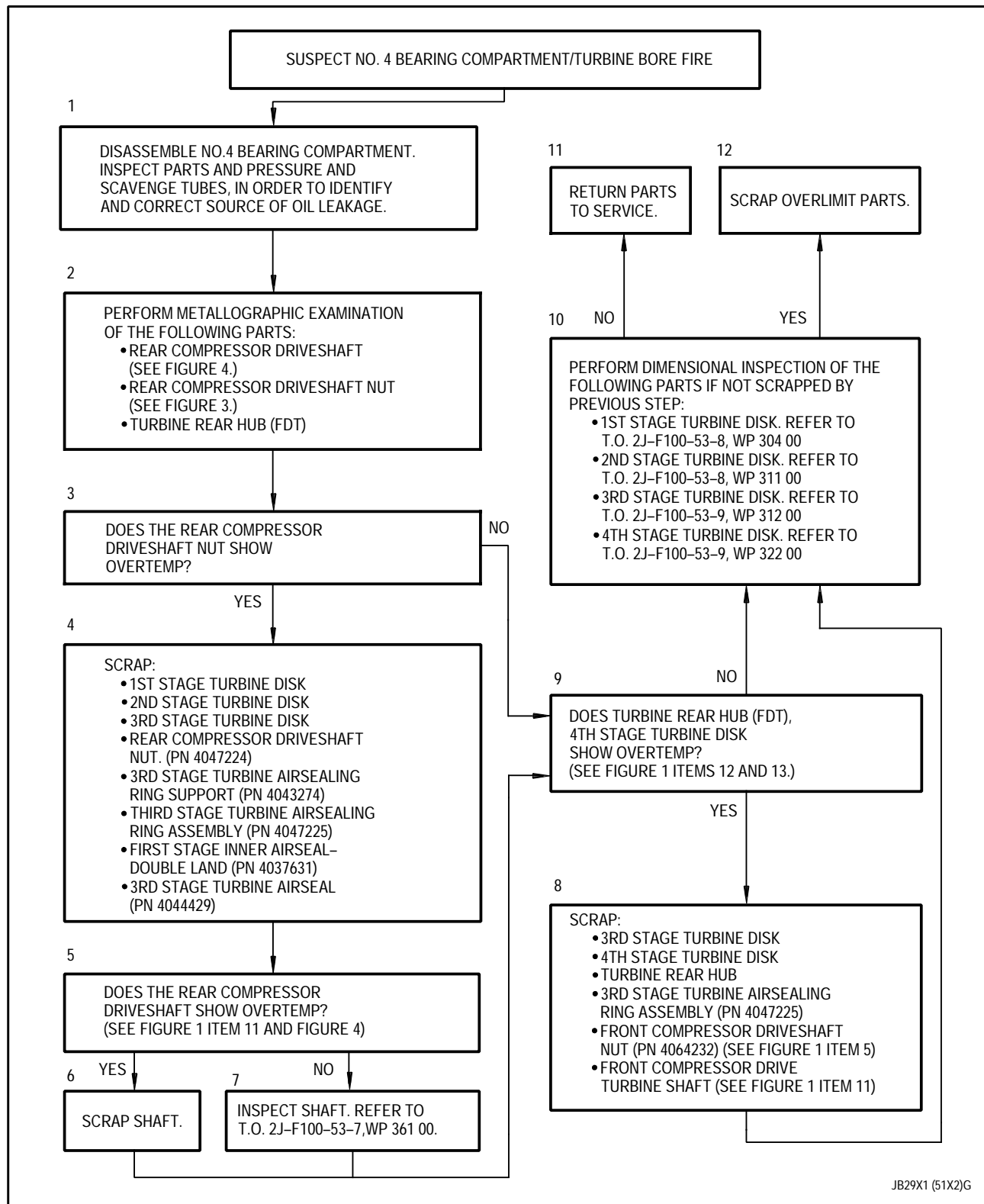
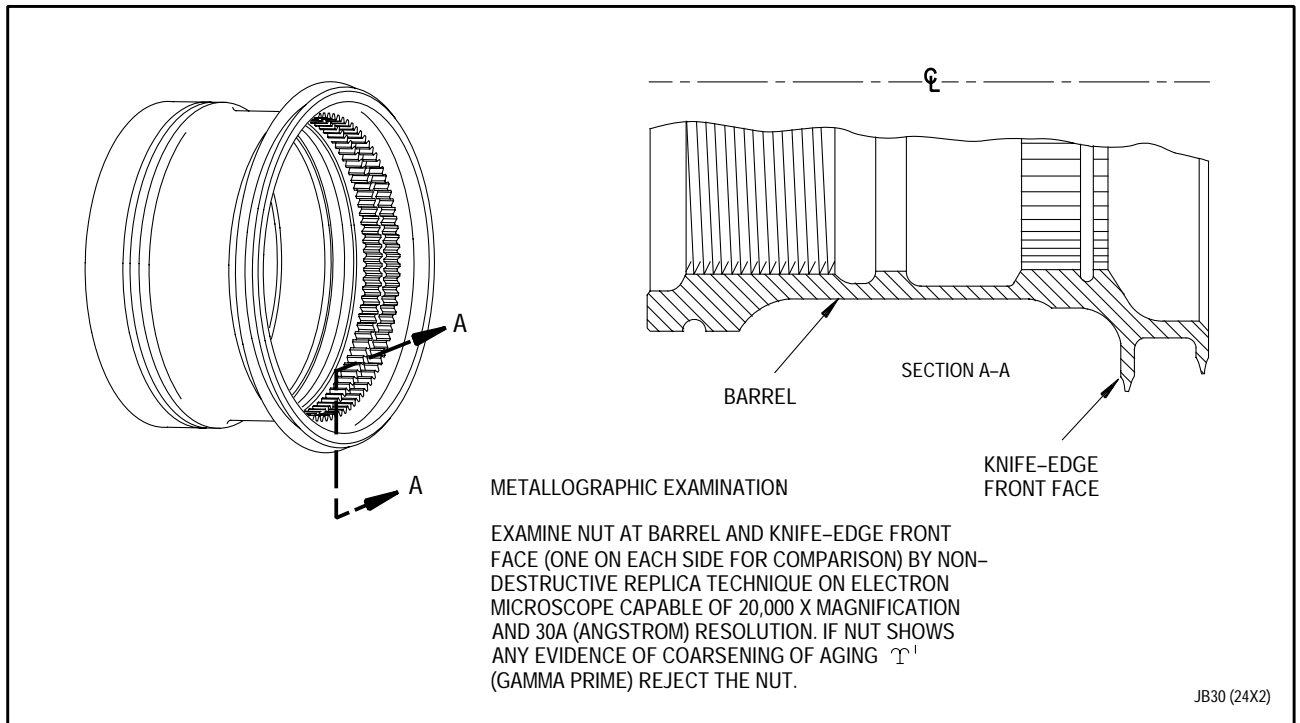
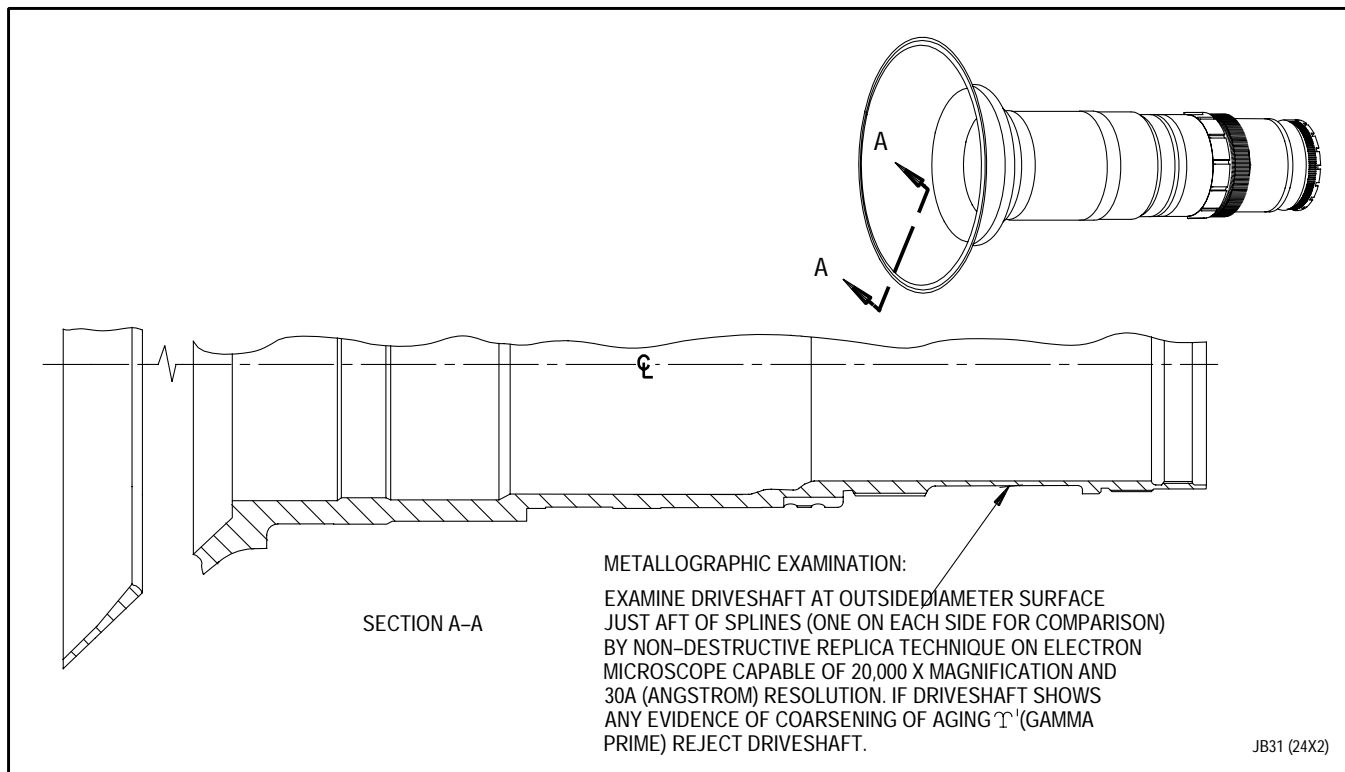


Figure 2. Suspected No. 4 Bearing Compartment/Turbine Bore Fire



**Figure 3. Rear Compressor Driveshaft Nut (PN 4047224) - Overtemperature Inspection (Metallographical Analysis) Following a Suspected No. 4 Bearing Compartment Fire**



**Figure 4. Rear Compressor Driveshaft (PN 4073123-09) - Overtemperature Inspection (Metallographical Analysis) Following a Suspected No. 4 Bearing Compartment Fire**

# WORK PACKAGE

## TECHNICAL PROCEDURES

### OIL CONSUMPTION, VERTICAL AND HORIZONTAL MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

## LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 12

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REFERENCE MATERIAL REQUIRED

Title	Number
Engine Test - - - - -	T.O. 2J-F100-11-2
Engine Oil Consumption Check Run (Troubleshooting) - - -	WP 607 00
Engine - - - - -	T.O. 2J-F100-53-5

Additional required reference material can be found in applicable tables.

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None



## 1. INTRODUCTION.

- a. This work package describes inspection and corrective action to be performed on an engine or module for oil consumption. It is assumed that fault isolation procedures were followed. Refer to T.O. 2J-F100-11-2.
- b. Corrective action consists of:
  - (1) locating the source of the oil leak,
  - (2) performing a bearing compartment vacuum leak check,
  - (3) repair or replacement of damaged hardware, and (4) performing an oil consumption check run. Refer to T.O. 2J-F100-11-2, WP 545 00.
- c. Depot maintenance procedures for complete engine in T.O. 2J-F100-53-5 are written for vertical assembly or disassembly. Fault isolation, investigation, and correction of oil consumption problems can be accomplished by utilizing horizontal assembly or disassembly procedures. This work package will also reference field maintenance procedures T.O. 2J-F100-56-5 which will provide optional horizontal maintenance procedures.

**2. VERTICAL MAINTENANCE.**

(See Tables 1 through 5).

- a. See tables 1 through 5 for vertical maintenance.

**Table 1. External and Internal Oil Leakage Vertical Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	<p>1. Visually inspect engine for source of external or internal oil leakage and proceed as follows:</p> <p>a. If oil leakage is external, repair, or replace applicable tube, connector, component, or gearbox.</p> <p>b. No. 1 bearing compartment oil leakage is indicated by oil wetness on full length of lower fan inlet case vanes.</p> <p>c. No. 2 and 3 bearing compartment oil leakage is indicated by either:</p> <p>(1) Smoke in cockpit.</p> <p>(2) A visible trail of oil (viewing between 1st stage blades) leading forward from No. 2 and 3 bearing area on bottom of front fan case and stator wall.</p>		

Table 1. External and Internal Oil Leakage Vertical Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
1. Engine (continued)	<p>(3) Visible oil leakage out front of compartment or oil wet 4th blades. Borescope inspect.</p> <p>d. No. 4 bearing compartment oil leakage is indicated by either:</p> <p>(1) Oil wetness at, or near 6 o'clock position, on outer fan duct wall on approximate plane of diffuser case.</p> <p>e. No. 5 bearing compartment oil leakage is indicated by oil wetness on outer fan duct wall at plane of turbine exhaust case, as viewed from inside augmentor duct.</p>	(3) T.O. 2J. F100-53-5, WP 020 00.	

**Table 2. No. 1 Bearing Compartment Oil Leakage Vertical Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	1. Inspect No. 1 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 1 bearing compartment.	a. T.O. 2J-F100-53-5, WP 430 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment vacuum check failure).

**Table 3. No. 2 and 3 Bearing Compartment Oil Leakage Vertical Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	1. Inspect No. 2 and 3 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 2 and 3 bearing compartment.	a. T.O. 2J-F100-53-5, WP 429 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment vacuum check failure).

**Table 4. No. 4 Bearing Compartment Oil Leakage Vertical Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	1. Inspect No. 4 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 4 bearing compartment.	a. T.O. 2J-F100-53-5, WP 429 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment vacuum check failure).

**Table 5. No. 5 Bearing Compartment Oil Leakage Vertical Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	1. Inspect No. 5 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 5 bearing compartment.	a. T.O. 2J-F100-53-5, WP 432 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment check failure).

**3. HORIZONTAL MAINTENANCE.**

(See Tables 6 through 10).

- a. See tables 6 through 10 for external and internal oil leakage horizontal maintenance.

**Table 6. External and Internal Oil Leakage Horizontal Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	1. Visually inspect engine for source of external or internal oil leakage as follows: a. If oil leakage is external, repair, or replace the applicable tube, connector, component, or gearbox module. b. For internal oil leakage, inspect engine exhaust, fan stream area, and inlet for oil leakage or residue. c. No. 1 bearing compartment oil leakage is indicated by oil wetness on the full length of vanes of lower fan inlet case.		

Table 6. External and Internal Oil Leakage Horizontal Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
1. Engine (continued)	d. No. 2 and 3 bearing compartment oil leakage is indicated by either: (1) Smoke in cockpit. (2) A visible trail of oil (viewing between 1st stage blades) leading forward from No. 2 and 3 bearing area on bottom of front fan case and stator wall. (3) Visible oil leakage out of front of compartment or oil wet 4th blades. Borescope inspect through AP7 port. (4) Refer to 1.b.(1).	(3) T.O. 2J-F100-56-5, WP 020 00	

Table 6. External and Internal Oil Leakage Horizontal Maintenance (continued)

Engine/Module	Area/Task	T.O./WP Reference	Remarks
1. Engine (continued)	<p>e. No. 4 bearing compartment oil leakage is indicated by either:</p> <p>(1) Oil wetness at or near 6 o'clock position on outer fan duct wall on approximate plane diffuser case augmentor duct.</p> <p>(2) Refer to 1.b.(1).</p> <p>f. No. 5 bearing compartment oil leakage is indicated by oil wetness on outer fan duct wall at plane of turbine exhaust case, as viewed from inside of augmentor duct.</p>		



Table 7. No. 1 Bearing Compartment Oil Leakage Horizontal Maintenance

Engine/Module	Area/Task	T.O./WP Reference	Remarks
1. Engine	1. Inspect No. 1 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 1 bearing compartment.	a. T.O. 2J-F100-56-5, WP 103 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment vacuum check failure).

Table 8. No. 2 and 3 Bearing Compartment Oil Leakage Horizontal Maintenance

Engine/Module	Area/Task	T.O./WP Reference	Remarks
1. Engine	1. Inspect No. 2 and 3 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 2 and 3 bearing compartment.	a. T.O. 2J-F100-56-5, WP 223 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment vacuum check failure).

**Table 9. No. 4 Bearing Compartment Oil Leakage Horizontal Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	1. Inspect No. 4 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 4 bearing compartment.	a. T.O. 2J-F100-56-5, WP 223 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment vacuum check failure).

**Table 10. No. 5 Bearing Compartment Oil Leakage Horizontal Maintenance**

<b>Engine/Module</b>	<b>Area/Task</b>	<b>T.O./WP Reference</b>	<b>Remarks</b>
1. Engine	1. Inspect No. 5 bearing compartment for oil leakage as follows: a. Vacuum leak check No. 5 bearing compartment.	a. T.O. 2J-F100-56-5, WP 154 00	a. If vacuum leak check is out of limits, refer to T.O. 2J-F100-53-2, WP 029 00 (bearing compartment vacuum check failure).

**WORK PACKAGE**

**TECHNICAL PROCEDURES**

**BEARING COMPARTMENT VACUUM CHECK FAILURE**

**EFFECTIVITY: ENGINE MODEL F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 8

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**REFERENCE MATERIAL REQUIRED**

Required reference material can be found in applicable tables.

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

**1. INTRODUCTION.**

- a. This work package describes the corrective action to be performed on an engine for bearing compartment vacuum check failure.
- b. Corrective action consists of bearing compartment teardown to locate and repair the actual leak source.

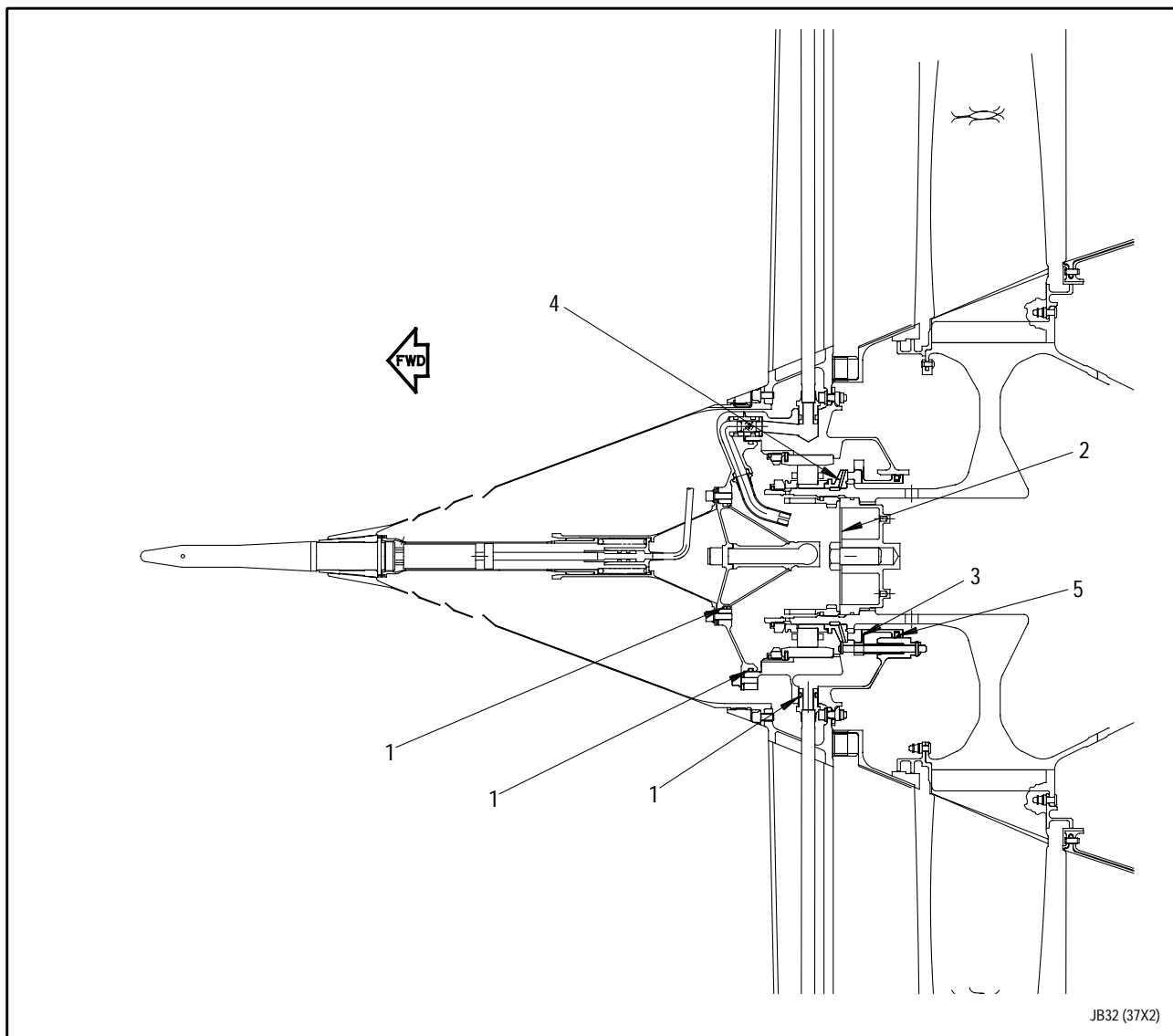
**2. BEARING COMPARTMENT VACUUM CHECK FAILURE MAINTENANCE.**

(See Figures 1 through 4 and Table 1.)

- a. See figures 1 through 4 and table 1 for bearing compartment vacuum check failure maintenance.

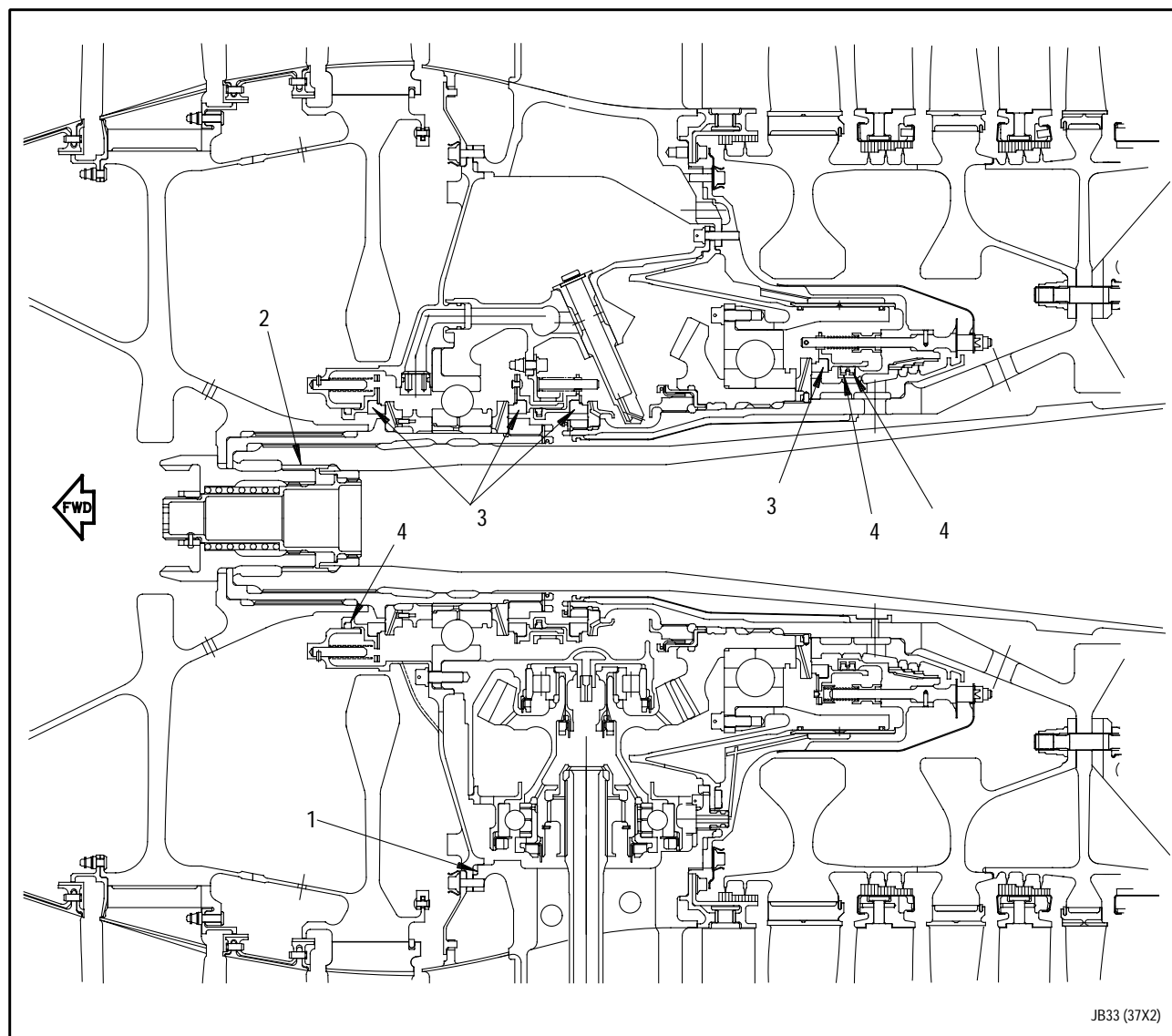
Table 1. Bearing Compartment Depot Maintenance

Module/Engine	Area/Module Task	T.O./WP References	Remarks
1. Engine, No. 1 bearing compartment	a. Remove inlet/ fan module and external parts.	a. T.O. 2J-F100-53-5, WP 120 00 and WP 134 00	
2. Engine, No. 2 and 3 bearing compartment	a. Remove core engine module (do not remove high pressure turbine from core module).  b. Disassemble core engine module.  c. Assemble core engine module subassemblies.  d. Perform final assembly of core engine module.  e. Assemble core engine module to the engine.	a. T.O. 2J-F100-53-5, WP 134 00  b. T.O. 2J-F100-53-7, WPs 011 00 and 014 00  c. T.O. 2J-F100-53-7, WP 701 00  d. T.O. 2J-F100-53-7, WPs 701 00 and 706 00  e. T.O. 2J-F100-53-5, WP 703 00	
3. Engine, No. 4 bearing compartment	a. Remove core engine module.  b. Disassemble rear core engine module.	a. T.O. 2J-F100-53-5, WP 134 00  b. T.O. 2J-F100-53-7, WP 011 00	
4. Engine, No. 5 bearing compartment	a. Remove fan drive turbine module.  b. Disassemble fan drive turbine module.	a. T.O. 2J-F100-53-5, WP 131 00  b. T.O. 2J-F100-53-9, WP 010 00 and WP 020 00	



1. Packings
2. Cover, counterweight housing
3. Seal, face, No. 1 bearing
4. Seat, No. 1 bearing seal
5. Seal ring

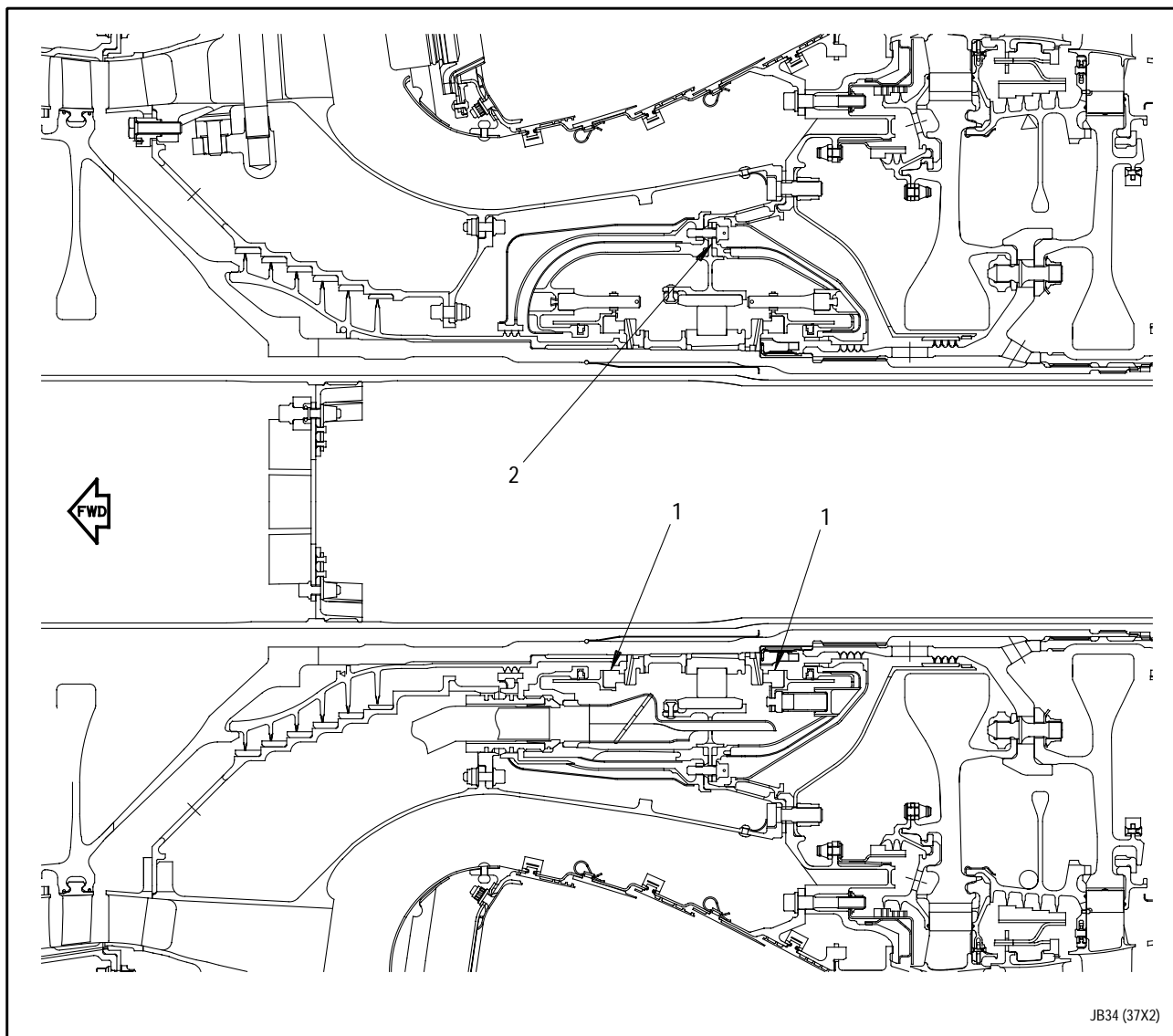
**Figure 1. No. 1 Bearing Compartment - Inspection**



1. Bearing and seal support seals
2. Shaft, front compressor drive turbine
3. Seal, face
4. Seal ring

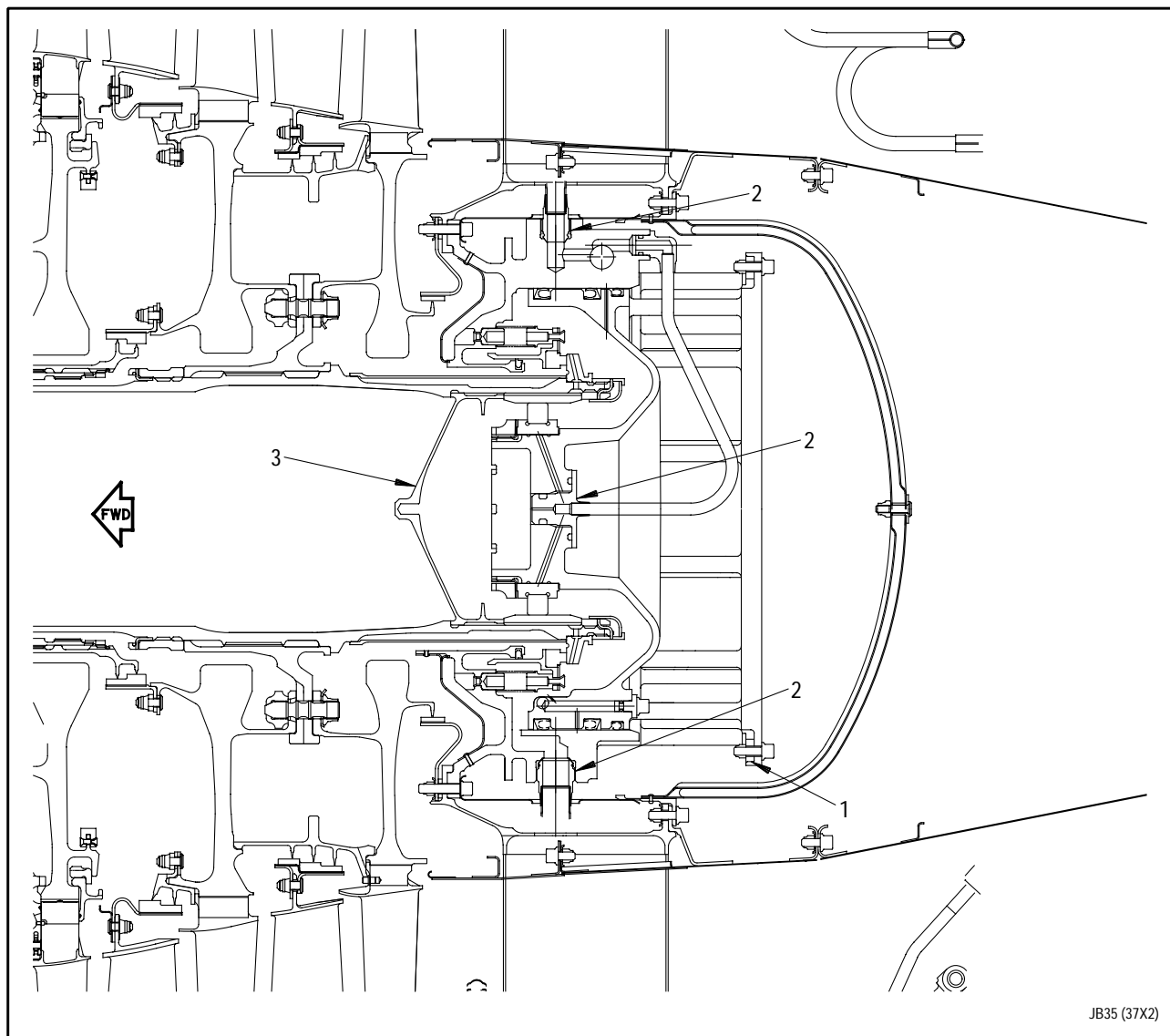
**Figure 2. No. 2 and 3 Bearing Compartment - Inspection**





1. Seal, face
2. Compartment split line

**Figure 3. No. 4 Bearing Compartment - Inspection**



1. Support flanges
2. Tube connectors
3. Plug

**Figure 4. No. 5 Bearing Compartment - Inspection**

**WORK PACKAGE**

**TECHNICAL PROCEDURES**

**CHIP DETECTOR PARTICLES/JOAP TEST FAILURE**

**EFFECTIVITY: ENGINE MODEL F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 10

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 - 10	.	.	.	.	0

REFERENCE MATERIAL REQUIRED

Title	Number
Engine Test - - - - -	T.O. 2J-F100-11-2
JOAP Wearmetal Guidelines - - - - -	WP 303 00
Joint Oil Analysis Program (JOAP) Laboratory Manual - - - -	T.O. 33-1-37
Lube Oil Filter OI/IPB - - - - -	T.O. 7J2-27-3

Additional required reference material can be found in applicable tables.

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package provides inspection and maintenance to be performed on the engine when metal particles are found in chip detectors, or JOAP (Joint Oil Analysis Program) levels exceed established criteria.
- b. Refer to the following manuals for inspection guidelines:
  - T.O. 33-1-37 for oil analysis operating procedures
  - T.O. 2J-F100-11-2, WP 303 00 for JOAP wearmetal guidelines
  - T.O. 2J-F100-11-2 for depot fault isolation diagrams

**2. CHIP DETECTOR RESIDUE.**

(See Table 1.)

- a. When chip detector inspection reveals particle residue, first identify the associated system. Refer to JOAP and Chip Detector fault tree analysis (oil system, suspect contamination)  
T.O. 2J-F100-11-2, WP 303 00.  
Each chip detector monitors one of four lubrication systems:
  - No. 1 bearing
  - No. 2 and 3 bearings and gearbox
  - No. 4 bearing
  - No. 5 bearing

Table 1. Chip Detector Residue Inspection and Maintenance

Engine Area	Task	T.O./WP Reference
1. Engine, No. 1 bearing compartment	a. Dismantle inlet/fan module to remove No. 1 bearing. b. Inspect No. 1 bearing. c. Replace No. 1 bearing. d. Reassemble and install fan inlet case.	a. T.O. 2J-F100-53-6, WP 012 00 b. T.O. 2J-F100-53-6, WP 304 00 c. T.O. 2J-F100-53-6, WP 702 00 d. T.O. 2J-F100-53-6, WP 702 00
2. Engine, No. 2 and 3 bearing compartment and gearbox	a. Remove gearbox module. b. Check top of gearbox. If chips are present, suspect damage to No. 2 and 3 bearing compartment/gearbox and proceed to step e. If no chips are present, suspect gearbox module and go to step c. c. Disassemble gearbox. Inspect for source of chips. d. If source of chips is found, replace gearbox module. e. If gearbox module inspection is negative, remove inlet/fan module. f. Disassemble core module. g. Remove No. 2 and 3 bearings.	a. T.O. 2J-F100-53-5, WP 106 00 c. T.O. 2J-F100-53-11, WPs 011 00, 014 00, and 301 00 through 399 00 d. T.O. 2J-F100-53-5, WP 721 00 e. T.O. 2J-F100-53-5, WP 134 00 f. T.O. 2J-F100-53-7, WP 011 00 and WP 014 00 g. T.O. 2J-F100-53-7, WPs 014 00 and 022 00

Table 1. Chip Detector Residue Inspection and Maintenance (continued)

Engine Area	Task	T.O./WP Reference
2. Engine, No. 2 and 3 bearing compartment and gearbox (continued)	h. Remove upper towershaft ball and roller bearings.	h. T.O. 2J-F100-53-7, WP 022 00
	i. Inspect bearings. Disposition nonserviceable bearings.	i. T.O. 2J-F100-53-7, WP 339 00
	j. Inspect bull gear and upper towershaft gear. Disposition nonserviceable gears.	j. T.O. 2J-F100-53-7, WP 311 00
	k. Install serviceable bearings and gears.	k. T.O. 2J-F100-53-7, WPs 605 00 and 701 00
	l. Reassemble core module.	l. T.O. 2J-F100-53-7, WPs 701 00 and 706 00
	m. Install inlet/fan module.	m. T.O. 2J-F100-53-5, WP 703 00
3. Engine, No. 4 bearing compartment	a. Remove rear outer fan duct.	a. T.O. 2J-F100-53-5, WP 107 00
	b. Remove fan drive turbine module.	b. T.O. 2J-F100-53-5, WP 131 00
	c. Disassemble core module and remove No. 4 bearing.	c. T.O. 2J-F100-53-7, WP 011 00
	d. Inspect No. 4 bearing.	d. T.O. 2J-F100-53-7, WPs 011 00 and 339 00
	e. Install replacement bearing and reassemble core.	e. T.O. 2J-F100-53-7, WP 701 00 and 706 00
	f. Reassemble engine.	f. T.O. 2J-F100-53-5, WPs 604 00 and 704 00

Table 1. Chip Detector Residue Inspection and Maintenance (continued)

Engine Area	Task	T.O./WP Reference
4. Engine, No. 5 bearing compartment	a. Remove augmentor duct and nozzle module.	a. T.O. 2J-F100-53-5, WP 101 00
	b. Disassemble fan drive turbine and remove No. 5 bearing.	b. T.O. 2J-F100-53-9, WP 011 00, 012 00, 022 00, and 023 00
	c. Visually inspect bearing for obvious distress, such as broken cage, spalled races, or damaged rollers.	
	d. Inspect inner and outer bearing supports, seal plate, and carbon seal assembly.	d. T.O. 2J-F100-53-9, WPs 325 00, 326 00, 329 00, and 332 00, 333 00, 335 00
	e. Install No. 5 bearing and reassemble fan drive turbine.	e. T.O. 2J-F100-53-9, WP 701 00
	f. Replace augmentor duct and nozzle module.	f. T.O. 2J-F100-53-5, WP 727 00



**3. JOAP TEST FAILURE.**

(See Tables 2 through 6.)

a. The Joint Oil Analysis Program (JOAP) test may reveal any of the following conditions:

- high aluminum (Refer to table 2.)
- high titanium (Refer to table 3.)

- high titanium and iron (Refer to table 4.)

- high iron (Refer to tables 5 and 6.)

b. In the case of high iron readings, make a preliminary evaluation, see table 5. When indicated, take maintenance action, see table 6.

**Table 2. JOAP High Aluminum (Al) Reading**

<b>Engine Area</b>	<b>Task</b>	<b>T.O./WP Reference</b>
1. Oil filter housing	a. Remove oil filter. b. Inspect filter housing. If no wear, proceed to step d. c. If wear is found, replace oil filter. d. Disposition old filter. e. If no wear in oil filter housing, remove gearbox module. f. Install replacement gearbox. g. Place engine on 10 hour JOAP surveillance.	a. T.O. 2J-F100-53-11, WP 011 00 b. T.O. 2J-F100-53-2, WP 008 00 c. T.O. 2J-F100-53-11, WP 707 00 d. T.O. 7J2-27-3 e. T.O. 2J-F100-53-5, WP 106 00 f. T.O. 2J-F100-53-5, WP 721 00

**Table 3. JOAP High Titanium (Ti) Reading**

<b>Engine Area</b>	<b>Task</b>	<b>T.O./WP Reference</b>
1. No. 5 bearing inner support	a. Remove augmentor duct and nozzle module. b. Disassemble No. 5 bearing compartment and remove No. 5 inner support. c. Inspect support, especially piston ring grooves, and replace if nonserviceable. d. Replace augmentor duct and nozzle module. e. Place engine on 10 hour JOAP surveillance.	a. T.O. 2J-F100-53-5, WP 101 00 b. T.O. 2J-F100-53-9, WP 012 00 c. T.O. 2J-F100-53-9, WP 335 00 d. T.O. 2J-F100-53-5, WP 727 00

**Table 4. JOAP High Titanium (Ti) and High Iron (Fe) Readings**

Engine Area	Task	T.O./WP Reference
1. No. 5 bearing compartment	a. Remove augmentor duct and nozzle. b. Disassemble No. 5 bearing compartment, and remove No. 5 inner support. c. Inspect No. 5 bearing supports, seal assembly face, and bearing seal, and replace any nonserviceable parts. If all parts are in acceptable condition, proceed to step d. d. Flush oil system and reassemble engine. e. Place engine on 10 hour JOAP surveillance.	a. T.O. 2J-F100-53-5, WP 101 00 b. T.O. 2J-F100-53-9, WP 012 00 c. T.O. 2J-F100-53-9, WPs 335 00, 330 00, and 334 00

**Table 5. JOAP High Iron (Fe) Reading - Evaluation**

Condition	Diagnosis	Action
<b>NOTE</b> JOAP readings of high iron (Fe) can be caused by wearmetal from various sources.		
1. Fe exceeds 15 ppm after long period of operation; no sudden change in level (more than 4 ppm in last 10 hours)	a. Probably normal wearmetal level	a. Flush oil system. b. Place engine on 10 hour JOAP surveillance.
2. Fe exceeds surveillance limits, or a 5 ppm increase between samples or Fe exceeds 9 ppm in 10 operating hours	a. Maintenance required	a. Proceed to table 6.
3. Increase in Fe more than 4 ppm but less than 9 ppm in a 10 hour operating period	a. Suspect No. 4 bearing	a. Place engine on 10 hour JOAP surveillance. If Fe increases further, proceed to table 6.

Table 6. JOAP High Iron (Fe) Reading - Maintenance

Engine Area	Task	T.O./WP Reference
1. Gearbox	a. Remove gearbox and check for metal on top of baffle or intermediate case strut bottom. b. If no metal is noted, remove gearbox and replace with another gearbox module. c. Place engine on 10 hour JOAP surveillance.	a. T.O. 2J-F100-53-11, WP 013 00 and 014 00 b. T.O. 2J-F100-53-5, WPs 605 00 and 721 00
2. No. 1 bearing	a. If surveillance indicates abnormal increase in Fe, inspect No. 1 bearing. See table 1, item 1.	
3. No. 5 bearing	a. If No. 1 bearing is acceptable, inspect the No. 5 bearing. See table 1, item 4.	
4. No. 2 and 3 bearing	a. If No. 5 bearing is acceptable, inspect the No. 2 and 3 bearings, the bull gear, the upper towershaft gear, and the towershaft bearings.	a. T.O. 2J-F100-53-7, WP 315 00 and 339 00
5. No. 4 bearing	a. If No. 2 and 3 bearing compartment is acceptable, remove fan drive turbine module. b. Remove No. 4 bearing. c. Inspect No. 4 bearing. d. Install serviceable bearing. e. Install fan drive turbine and assemble engine. f. Place engine on 10 hour JOAP surveillance. If JOAP readings continue to exceed limits, ship engine to depot.	a. T.O. 2J-F100-53-5, WPs 108 00, 109 00, and 131 00 b. T.O. 2J-F100-53-7, WP 011 00 c. T.O. 2J-F100-53-7, WP 339 00 d. T.O. 2J-F100-53-7, WP 706 00 e. T.O. 2J-F100-53-5, WP 705 00

# WORK PACKAGE

## TECHNICAL PROCEDURES

### FUEL LEAKAGE

EFFECTIVITY: ENGINE MODELS F100-PW-229

#### LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

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1 - 6					0

REFERENCE MATERIAL REQUIRED

Title	Number
Engine Test - - - - -	T.O. 2J-F100-11-2
Troubleshooting Fault Isolation	
Diagrams - - - - -	WP 502 00

Additional required reference material can be found in applicable tables.

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package describes the corrective action to be performed on an engine that has been rejected for fuel leakage. It is assumed that fault isolation procedures per T.O. 2J-F100-11-2, WP 502 00 were followed.
- b. Corrective action depends on the location of the leak.
- c. Any fuel or hydraulic fluid leaking from a cracked tube or manifold requires a turbine borescope inspection. Refer to T.O. 2J-F100-53-5, WP 026 00 and WP 027 00.
- d. Perform an engine vibration check if borescope inspection does not detect a fractured turbine blade. Refer to T.O. 2J-F100-11-2 WP 218 00.

**2. FUEL LEAKAGE LOCATION INSPECTION.**

(See Table 1.)

Table 1. Fuel Leakage Location Inspection

Module/Engine	Area/Module Task	T.O./WP References	Remarks
<b>NOTE</b>			
Fuel dripping through the bosses or flanges near the bottom of the fan ducts can be a symptom of a broken fuel manifold to the core.			
1. Bottom of fan duct flanges	<p>a. Disassemble engine as follows:</p> <p>(1) Remove augmentor duct and nozzle module from engine.</p> <p>(2) Remove No. 5 support rods.</p> <p>(3) Remove front and rear fan ducts as a unit.</p> <p>b. Remove left and right fuel supply manifold. Inspect fuel manifold loop clamps; replace broken clamps, clamps with missing tab supports, torn or missing asbestos padding. Inspect brackets, replace broken, cracked, or worn brackets.</p> <p>c. Perform manifold inspections as follows:</p> <p>(1) Perform fluorescent penetrant inspection (FPI) on manifolds and fuel supply tubes.</p>	<p>(1) T.O. 2J-F100-53-5, WP 101 00.</p> <p>(2) T.O. 2J-F100-53-5, WP 112 00.</p> <p>(3) T.O. 2J-F100-53-5, WP 107 00.</p> <p>b. T.O. 2J-F100-53-7, WP 011 00.</p> <p>(1) T.O. 2-1-111, Section 8.</p>	



Table 1. Fuel Leakage Location Inspection (continued)

Module/Engine	Area/Module Task	T.O./WP References	Remarks
1. Bottom of fan duct flanges (continued)	c. Perform inspections (continued)  (2) Perform a pressure leak check on the fuel manifolds and fuel supply tubes  (3) If fuel manifold or fuel supply tubes fails FPI or pressure leak check, return manifold to depot.  d. Install serviceable left and right fuel supply manifold.  e. Assemble engine as follows: (1) Install front and rear fan ducts as a unit. (2) Install No. 5 bearing support rods. (3) Install augmentor duct and nozzle module to engine.	  (2) T.O. 2J-F100-53-7, WP 340 00.        d. T.O. 2J-F100-53-7, WP 706 00.      (1) T.O. 2J-F100-53-5, WP 707 00.  (2) T.O. 2J-F100-53-5, WP 720 00.  (3) T.O. 2J-F100-53-5, WP 727 00.	

Table 1. Fuel Leakage Location Inspection (continued)

Module/Engine	Area/Module Task	T.O./WP References	Remarks
<b>NOTE</b>			
Fuel dripping from the augmentor spray rings is normal if the engine was shut down very soon after using the augmentor without allowing sufficient time at higher power to drain the spray rings.			
3. Spray rings dripping	a. Dripping spray rings may indicate a faulty augmentor fuel control	T.O. 2J-F100-11-2 WP 543 00	

**WORK PACKAGE**

**TECHNICAL PROCEDURES**

**UNSCHEDULED MAINTENANCE**

**GEARBOX**

**START ANOMALY**

**EFFECTIVITY: ENGINE MODEL F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 4

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1 - 4 . . . . .		3			

**REFERENCE MATERIAL REQUIRED**

Required reference material can be found in applicable tables.

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

**1. INTRODUCTION.**

- a. This work package describes corrective action to be taken on gearbox module if starter anomaly happens on test stand.

**2. GEARBOX START ANOMALY - CLASSIFICATION.**

- a. High torque capacity of test stand starter can cause gearbox spur gear tooth damage if torque is abruptly applied or released.

- b. Perform corrective action if any of the following conditions occur:

- (1) Air starter is re-engaged while engine is rotating.
- (2) Starter shaft shears.
- (3) Starter to gearbox coupling adapter disengages during start.
- (4) Starter hose blows off.
- (5) Gearbox coupling shears.

**3. CORRECTIVE ACTION.**

- a. See Table 1.

Table 1. Gearbox Start Anomaly - Gearbox Spur Gear Replacement

Module/Engine	Area/Module Task	T.O./WP References	Remarks
1.Engine	a. Remove gearbox module.	a. T.O. 2J-F100-53-5, WP 106 00.	
2.Gearbox module	a. Replace spur gears. b. Inspect remaining gearbox components.	T.O. 2J-F100-53-11, WPs 011 00, 012 00, 013 00, 014 00, 023 00, 026 00.	
3.Assembly	a. Reassemble gearbox module.	a. T.O. 2J-F100-53-11, WPs 602 00, 603 00, and 701 00 through 707 00.	
	b. Install gearbox module and complete engine assembly.	b. T.O. 2J-F100-53-5, WP 721 00.	

**WORK PACKAGE****TECHNICAL PROCEDURES****AUGMENTOR DISTRESS****EFFECTIVITY: ENGINE MODELS F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 12

<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>	<b>PAGE NO.</b>	<b>CHANGE NO.</b>
1 . . . . .	25	4 . . . . .	4	8A Added . . . . .	25
2 . . . . .	4	5 - 6 . . . . .	19	8B Blank Added . . . . .	25
3 . . . . .	19	7 - 8 . . . . .	25	9 - 10 Added . . . . .	19

**REFERENCE MATERIAL REQUIRED**

Required reference material can be found in applicable tables.

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None



## 1. INTRODUCTION.

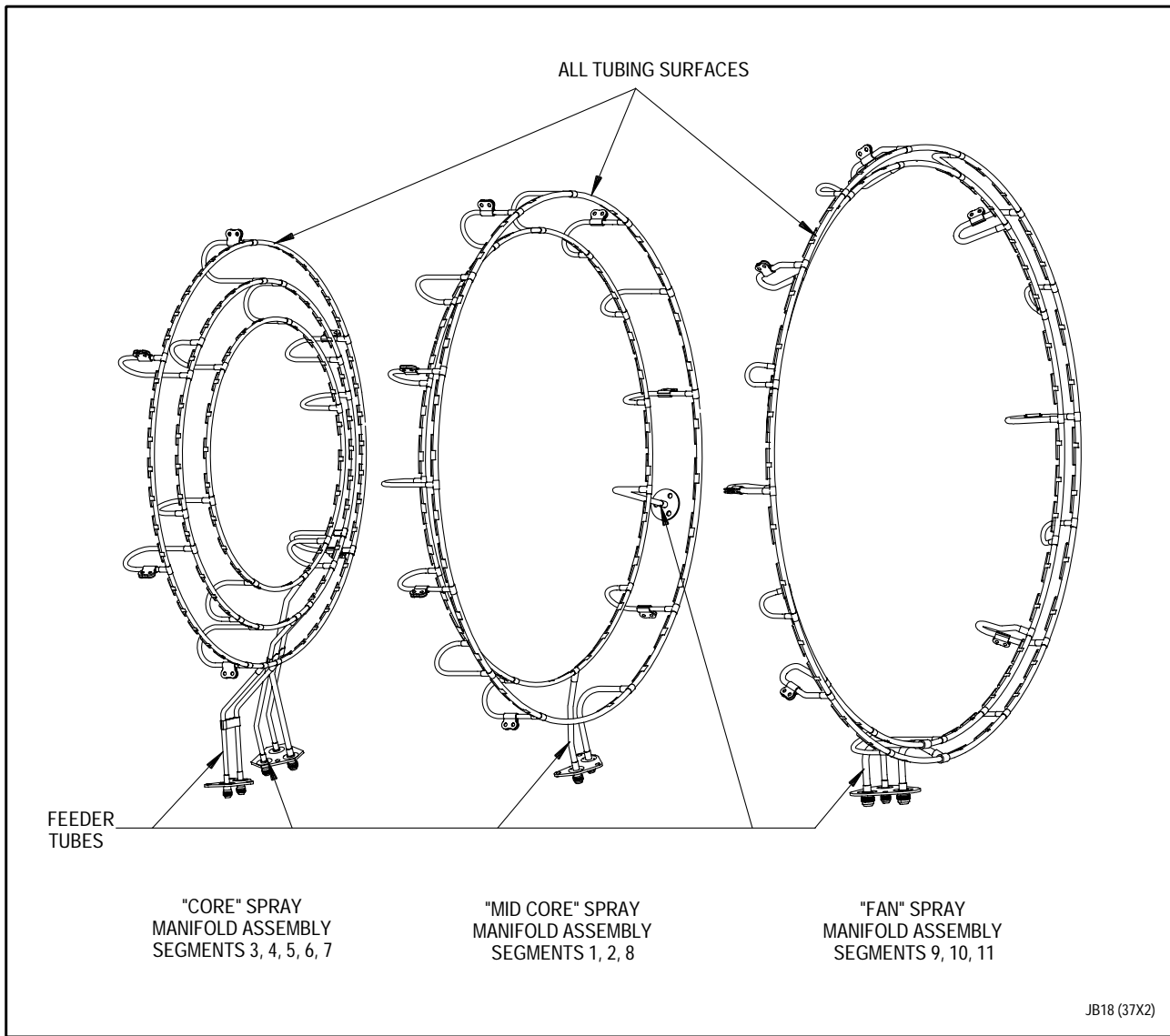
### NOTE

- Augmentor burn-through is burn-through of augmentor liner and/or duct, usually at mid to forward area of liner/duct.
  - Nozzle burn-through is burn-through of nozzle support and/or any of nozzle segments, seals, segment liners, and seal liners. Occasionally aft end of liner/duct will be burned.
  - Nozzle crunch is unsynchronized movement of nozzle hardware that results in distress, with no or minimal apparent burning.
- a. Augmentor liner aft end thermal distress occurs predominantly at 7:30 position aft looking forward (ALF). Typical distress: aft end barrel warpage/burning/erosion and fingerseal burning/erosion.
  - b. This WP provides guidelines and corrective action for augmentor or nozzle burn-through, or crunch.
  - c. Burn-through occurs when components that are normally exposed to cool environments (augmentor duct, support structure, nozzle segments) burn.
  - d. Corrective action consists of identifying burn-through cause and replacing components that fail inspection criteria.
  - e. Augmentor burn-through is most often caused by fuel leaks originating from damaged or failed (1) spray rings, or (2) augmentor fuel pump.
  - f. Nozzle burn-through or crunch is most often caused by balance segment, convergent segment, or actuator/nozzle rigging anomalies.
  - g. Augmentor liner aft end distress and burning is caused by circumferentially localized rich fuel/air ratio from fan spray manifold PN 4075541-01.
  - h. Augmentor liner aft end burning can be caused by excessive cooling air leakage due to non-serviceable augmentor module hardware (augmentor liner out-of-round condition, duct fingerseal jamming, balance seal/balance flap distress, convergent seal/convergent flap distress typical).

## 2. AUGMENTOR SPRAY MANIFOLDS INSPECTION - FOLLOWING BURNTHROUGH OF LINER AND DUCT.

(See Figure 1.)

- a. Visually inspect all segments on each spray manifold assembly for signs of thermal distress, fractures or cracks, and punctures in tubing (per figure 1).



**Figure 1. Augmentor Spray Manifolds Inspections**

**3. AUGMENTOR DUCT AND NOZZLE MODULE  
MAINTENANCE AND INSPECTION AFTER  
AUGMENTOR BURN-THROUGH.**

(See Table 1.)

- a. Refer to table 1 for augmentor duct and nozzle module maintenance and inspection after augmentor burn-through.

**Table 1. Augmentor Duct and Nozzle Module Maintenance and Inspection After Augmentor Burn-Through**

Engine/Module	Area Task	T.O./WP Reference	Remarks
1. Augmentor duct and nozzle module	<p>a. Remove augmentor duct and nozzle module.</p> <p>b. Visually inspect turbine exhaust case, flameholder, and sprayrings for obvious distress.</p> <p>c. Inspect flameholder support rod attachments.</p> <p>d. Visually inspect fan duct passage for distress or blockage.</p> <p>e. Disassemble augmentor nozzle modules as follows:</p> <p>(1) Remove combustion chamber liner.</p> <p>(2) Remove augmentor nozzle assembly.</p> <p>(3) Disassemble any distressed area of augmentor nozzle assembly.</p>	<p>a.T.O. 2J-F100-53-5, WP 101 00</p> <p>c.T.O. 2J-F100-53-5, WP 421 00</p> <p>(1)T.O. 2J-F100-53-10, WP 011 00</p> <p>(2)T.O. 2J-F100-53-10, WP 011 00</p> <p>(3)T.O. 2J-F100-53-10, WP 021 00 through WP 023 00</p>	

Table 1. Augmentor Duct and Nozzle Module Maintenance and Inspection After Augmentor Burn-Through (continued)

Engine/Module	Area Task	T.O./WP Reference	Remarks
1. Augmentor duct and nozzle module (continued)	<p>f. Inspect augmentor parts as follows:</p> <p>(1) Inspect augmentor combustion chamber liner.</p> <p>(2) Inspect augmentor duct assembly.</p> <p>(3) Inspect any disassembled nozzle components. Disposition nonserviceable parts for repair or condemnation.</p> <p>g. Assemble augmentor nozzle as follows:</p> <p>(1) Assemble augmentor nozzle assembly.</p> <p>(2) Assemble and size augmentor duct and nozzle module assembly.</p> <p>h. Install augmentor duct and nozzle module on engine.</p> <p>i. An engine shall have an engine start and augmentor functional check.</p>	<p>(1) T.O. 2J-F100-53-10, WP 303 00</p> <p>(2) T.O. 2J-F100-53-10, WP 328 00</p> <p>(3) T.O. 2J-F100-53-10, WPs 302 00 through 334 00</p> <p>(1) T.O. 2J-F100-53-10, WP 601 00 through 603 00</p> <p>(2) T.O. 2J-F100-53-10, WPs 701 00 and 702 00</p> <p>h. T.O. 2J-F100-53-5, WP 727 00</p> <p>i. T.O. 2J-F100-51-2, WP 006 00</p>	

#### 4. AUGMENTOR DUCT AND NOZZLE MODULE MAINTENANCE AND INSPECTION AFTER NOZZLE BURN-THROUGH OR CRUNCH.

(See table 2.)

maintenance and inspection after  
nozzle burn-through or crunch.

- a. Refer to table 2 for augmentor  
duct and nozzle module

**Table 2. Augmentor Duct and Nozzle Module Maintenance and Inspection After Nozzle Burn-Through or Crunch**

Engine/Module	Area Task	T.O./WP Reference	Remarks
1. Augmentor duct and nozzle module	<p>a. Remove augmentor duct and nozzle module.</p> <p>b. Visually inspect turbine exhaust case, flameholder, and sprayrings for obvious distress.</p> <p>bl. Perform augmentor nozzle actuator functional check.</p> <p>c. Disassemble augmentor nozzle module as follows:</p> <p>(1) Remove combustion chamber liner.</p> <p>(2) Remove augmentor nozzle assembly.</p> <p>(3) Disassemble any distressed area of augmentor nozzle assembly.</p> <p>(4) Disassemble nozzle seal and nozzle segment assemblies.</p> <p>(5) Remove primary and secondary actuators.</p>	<p>a.T.O. 2J-F100-53-5, WP 101 00</p> <p>bl.T.O. 2J-F100-53-10, WP 703 00</p> <p>(1)T.O. 2J-F100-53-10, WP 011 00</p> <p>(2) T.O. 2J-F100-53-10, WP 011 00</p> <p>(3)T.O. 2J-F100-53-10, WP 021 00</p> <p>(4)T.O. 2J-F100-53-10, WPs 022 00 and 023 00</p> <p>(5)T.O. 2J-F100-53-10, WP 011 00</p>	

**Table 2. Augmentor Duct and Nozzle Module Maintenance  
and Inspection After Nozzle Burn-Through or Crunch (continued)**

Engine/Module	Area Task	T.O./WP Reference	Remarks
1. Augmentor duct and nozzle module (continued)	<p>d. Inspect augmentor parts as follows:</p> <p>(1) Inspect augmentor combustion chamber liner.</p> <p>(2) Inspect augmentor duct assembly.</p> <p>(3) Inspect any disassembled nozzle components. Disposition nonserviceable parts for repair or condemnation.</p> <p>(4) Inspect primary and secondary actuators as follows: If any actuator fails inspection, reject all five actuators. Disposition as nonserviceable.</p> <p>(a) Torque check primary and secondary actuators.</p> <p>(b) Inspect primary and secondary actuator flex shafts.</p> <p>e. Replace all nonserviceable parts and clean remaining serviceable parts.</p>	<p>(1) T.O. 2J-F100-53-10, WP 303 00</p> <p>(2) T.O. 2J-F100-53-10, WP 328 00</p> <p>(3) T.O. 2J-F100-53-10, WP 302 00 through 334 00</p> <p>(4) T.O. 2J-F100-53-4, WP 043 00</p> <p>e. T.O. 2J-F100-53-10, WP 201 00</p>	

**Table 2A. Augmentor Duct and Nozzle Module Maintenance  
and Inspection After Nozzle Burn-Through or Crunch (continued)**

Engine/Module	Area Task	T.O./WP Reference	Remarks
1. Augmentor duct and nozzle module (continued)	<p>f. Assemble augmentor nozzle module as follows:</p> <p>(1) Assemble augmentor nozzle assembly.</p> <p>(2) Assemble and size augmentor duct and nozzle module assembly.</p>	<p>(1)T.O. 2J-F100-53-10, WP 601 00 through 603 00</p> <p>(2)T.O. 2J-F100-53-10, WP 701 00 and 702 00</p>	
	<p>g. Install augmentor duct and nozzle module on engine.</p> <p>h. Engine shall have an engine start and augmentor functional check.</p>	<p>g. T.O. 2J-F100-53-5, WP 727 00</p> <p>h. T.O. 2J-F100-11-2, WP 210 00</p>	





# **5. SPRAYRING AND AUGMENTOR MODULE INSPECTION AND MAINTENANCE FOLLOWING AUGMENTOR LINER AFT END DISTRESS AND BURNING.**

(See Table 3.)

- a. Refer to table 3 for sprayring and augmentor module inspection

and maintenance following augmentor liner aft end distress and burning.

**Table 3. Sprayring and Augmentor Module Inspection and Maintenance Following Augmentor Liner Aft End Distress and Burning**

Engine/Module	Area Task	T.O./WP Reference	Remarks
1. Augmentor/ nozzle module	<p>a. Remove augmentor/nozzle module.</p> <p>b. Visually inspect turbine exhaust case, flameholder, and sprayrings for obvious distress.</p> <p>c. Visually inspect fan duct passages for distress or blockage.</p> <p>d. Visually inspect augmentor/nozzle module for obvious distress</p> <p>e. Disassemble augmentor/nozzle module as follows:            (1)Remove augmentor combustion chamber liner.            (2) Disassemble any distressed area of nozzle assembly.</p> <p>f. Inspect augmentor/nozzle parts as follows:            (1)Inspect augmentor combustion chamber liner.            (2) Inspect any disassembled nozzle components.            (3) Disposition nonserviceable parts for repair or condemnation.</p>	<p>T.O. 2J-F100-53-5, WP 101 00</p> <p>(1)T.O. 2J-F100-53-10, WP 011 00            (2)T.O. 2J-F100-53-10, WP 021 00 through 023 00</p> <p>(1)T.O. 2J-F100-53-10, WP 303 00            (2)T.O. 2J-F100-53-10, WP 302 00 through 334 00</p>	

**Table 3. Spraying and Augmentor Module Inspection and Maintenance Following Augmentor Liner Aft End Distress and Burning (continued)**

Engine/Module	Area Task	T.O./WP Reference	Remarks
1. Augmentor/ nozzle module (Continued)	g. Replace fan spray manifold PN 4075541-01 with PN 4083223-01 or PN 4082793-01. Skip step (h).	g. T.O. 2J-F100-53-5, WP 158 00 and 159 00	If PN 4083223-01 or 4082793-01 is not available, skip step g and go to step h.
	h. Replace fan spray manifold PN 4075541-01 with same PN.	h. T.O. 2J-F100-53-5, WP 158 00 and 159 00	
	i. Reassemble nozzle assy for any parts removed in step e.(2).	i. T.O. 2J-F100-53-10, WP 601 00 through 603 00	
	j. Install serviceable augmentor combustion chamber liner	j. T.O. 2J-F100-53-10, WP 701 00	
	k. Install augmentor/nozzle module. Skip step l.	k. T.O. 2J-F100-53-5, WP 727 00	If augmentor liner out-of-limits aft end distress repeats, go to step l.
	l. Replace augmentor/nozzle module.	l. T.O. 2J-F100-53-5, WP 101 00 and 727 00	
	m. Engine shall have an engine start and augmentor functional check.	m. T.O. 2J-F100-51-2, WP 006 00	

# WORK PACKAGE

## TECHNICAL PROCEDURES

### VOLCANIC ASH INGESTION- UNSCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

## LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
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6	.	.	.	.	5

REFERENCE MATERIAL REQUIRED

Title	Number
Engine - - - - -	T.O. 2J-F100-53-5
Borescope Inspection - - - - -	WP 020 00

Required reference material can be found in applicable table.

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Solvent, petroleum	P-D-680, Type II, or type III

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

**1. INTRODUCTION.**

- a. This work package contains guidelines for the inspection and corrective action for volcanic ash ingestion.
- b. Engine operation can be affected by volcanic ash ingestion even when exposed for very limited periods of time. General observations include higher FTIT levels, reduced engine thrust, vibration, possible engine surge and/or flameout.
- c. Volcanic ash is very abrasive and can cause possible engine contamination as follows:
  - (1) Erosion of compressor blades, blade rubstrips and gaspath components. Generally erosion is more significant in rear stages of compressor.
  - (2) Clogged turbine cooling air passages which result in reduced life of turbine hardware; clogging of engine control sense lines and air supplied external components can also result.
  - (3) Degradation of oil system; black oil and/or volcanic ash metals in JOAP sample.
- d. Corrective action consists of inspecting engine and cleaning and/or replacing effected parts.

**2. PRELIMINARY INSPECTION FOR VOLCANIC ASH INGESTION.**

(See Table 1.)

**NOTE**

Indications of severe erosion are nose cone anti-ice hole erosion, and blade leading edge tip erosion or rounding; debris build-up on turbine blade and/or vanes may also cause clogging or glazing over cooling holes.

- a. If an engine assembly is received for volcanic ash ingestion, perform inspection in step c. to determine the extent of damage.
- b. If core module is received for volcanic ash ingestion, go to table 1 for inspection procedures.
- c. Inspect engine for volcanic ash debris as follows:
  - (1) Visually inspect engine inlet and exhaust.
  - (2) Perform complete engine borescope at ports AP 1,2,3,4,6 and 7. Refer to T.O. 2J-F100-56-5, WP 020 00.
  - (3) If volcanic ash is found in engine, go to table 1.

Table 1. Volcanic Ash Ingestion

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
1.Dissassemble engine	a. Remove core.	a. T.O. 2J-F100-53-5, WP 134 00	
	b. Remove rear compressor drive turbine and No. 4 bearing.	b. T.O.2J-F100-53-7, WP 011 00	
	c. Remove 4th through 7th stage compressor case, 10th through 13th stage stators, and No. 2 bearing assembly.	c. T.O. 2J-F100-53-7, WP 014 00	
2. Inspection	a. Inspect No. 4 bearing components for ash debris as follows:		
	(1)Bearing housing	(1) T.O.2J-F100-53-7, SWP 327 01	(1) Clean. Refer to T.O.2J-F100-53-1, WP 031 00 and SWP 037 01.
	(2)Front/Rear Carbon Seal Assembly	(2) T.O.2J-F100-53-7, SWP 320 01	(2) Clean. Refer to T.O. 2-1-111.
	(3)Front/Rear Seal Seat	(3) T.O.2J-F100-53-7, SWP 306 01	(3) Clean. Refer to T.O.2J-F100-53-1, SWP 031 01, SWP 031 04 and SWP 031 09.
	(4)Front/Rear Seal Support Assembly	(4) T.O.2J-F100-53-7, SWP 326 01	(4) Clean. Refer to T.O.2J-F100-53-1, SWP 031 01 and SWP 031 09.
	(5)Seal Rings	(5) T.O.2J-F100-53-7, SWP 342 01	(5) Clean. Refer to T.O.2J-F100-53-1, SWP 031 01 and SWP 031 09.
	(6)Scoop	(6) T.O.2J-F100-53-7, SWP 328 01	(6) Clean.Refer to 2J-F100-53-7, WP 201 00.

Table 1. Volcanic Ash Ingestion (continued)

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
2. Inspection (continued)	b. Inspect rear compressor drive turbine for ash debris as follows:		
	(1) Vanes, 1st stage, turbine stator		(1) a. Clean and heat tint. Refer to T.O. 2J-F100-53-7, SWP 201 01. b. Visual inspect. Refer to T.O. 2J-F100-53-7, WP 360 00.
	(2) Blades, 1st stage, turbine rotor		(2) a. Clean and heat tint. Refer to T.O. 2J-F100-53-8, SWP 201 01. b. Visual inspect. Refer to T.O. 2J-F100-53-8, WP 303 00.
	(3) Vanes, 2nd stage, turbine stator	(3) T.O. 2J-F100-53-8, WP 308 00	(3) Replace vanes, if over limits.
	(4) Blades, 2nd stage, turbine rotor	(4) T.O. 2J-F100-53-8, WP 310 00	(4) Replace vanes, if over limits.
	c. Inspect core for ash debris as follows:		
	(1) 4th through 7th stage tip shrouds	(1) T.O. 2J-F100-53-7, SWP 388 01	(1) If over limits, replace part(s).
	(2) 8th through 12th stage stator vanes	(2) T.O. 2J-F100-53-7, SWP 352 01 and SWP 355 01	(2) If over limits, replace part(s).
	(3) 4th through 13th stage blades	(3) T.O. 2J-F100-53-7, SWP 374 01	(3) If over limits, replace part(s).

Table 1. Volcanic Ash Ingestion (continued)

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
2. Inspection (continued)	d. Inspect No. 2 bearing for ash debris as follows:		
	(1) Seal Support Assembly	(1) T.O. 2J-F100-53-7, SWP 309 01	(1) Steam or P-D-680 clean, Type II or Type III
	(2) Front Carbon Seal Assembly	(2) T.O. 2J-F100-53-7, SWP 317 01	(2) Clean. Refer to T.O. 2-1-111.
3. Assemble Engine	(3) Front Seal Seat Assembly	(3) T.O. 2J-F100-53-7, SWP 306 01	(3) Clean. Refer to T.O. 2J-F100-53-7, SWP 031 01, SWP 031 04 and SWP 031 09
	a. Assemble 4th through 7th stage compressor case, 10th through 13th stage stators, and No. 2 bearing assembly.	a. T.O. 2J-F100-53-7, WP 701 00	
	b. Assemble rear compressor drive turbine and No. 4 bearing.	b. T.O. 2J-F100-53-8, WP 701 00	
	c. Assemble core.	c. T.O. 2J-F100-53-5, WP 700 00	



# WORK PACKAGE

## TECHNICAL PROCEDURES

### CORE ENGINE MODULE MAINTENANCE AFTER REJECTION FOR STALLS -

## UNSCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

THIS WORK PACKAGE SUPERSEDES WP 035 00 THROUGH AND INCLUDING CHANGE 10

### LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

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**REFERENCE MATERIAL REQUIRED**

<b>Title</b>	<b>Number</b>
On Condition Maintenance - - - - -	T.O. 2J-F100-53-2
PWA 284 Abradable Upgrade for 7th through 12th Stage	
Compressor Stators With PWA 279 Abradable - - - - -	WP 036 00
Engine - - - - -	T.O. 2J-F100-53-5
Core Engine Module - Removal - - - - -	WP 134 00
Module and Fan Ducts Installation - - - - -	WP 700 00
Core Engine Module - - - - -	T.O. 2J-F100-53-7
Core Engine Module - Dismantling (Rear) - - - - -	WP 011 00
Core Engine Module - Dismantling (Front) - - - - -	WP 014 00
Stator Segment, Compressor, Tenth Through Twelfth Stage	
Assembly - Inspection After Volcanic Ash Ingestion - - - - -	SWP 352 01
Stator Segments, Compressor, Seventh Through Ninth Stage	
Assemblies - Inspection After Volcanic Ash Ingestion - - - - -	SWP 355 01
Blades, Compressor Rotor. Fourth Through Thirteenth Stage	
and Fourth Through Seventh Stage Blade Locks - Inspection	
After Volcanic Ash Ingestion - - - - -	SWP 374 01
Duct Segment, Compressor, Fourth, Fifth, Sixth and Seventh	
Stage - Inspection After Volcanic Ash Ingestion - - - - -	SWP 388 01
Core Engine Module - Final Assembly (Front) - - - - -	WP 701 00
Rear Compressor Drive Turbine - - - - -	T.O. 2J-F100-53-8
Rear Compressor Drive Turbine - Final Assembly - - - - -	WP 701 00

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

**1. INTRODUCTION.**

- a. This work package contains guidelines for inspection and corrective action of core engine module for engine stalls.
- b. Corrective action consists of inspecting core engine module and replacing superseded and unserviceable parts.

**2. PRELIMINARY INSPECTION FOR STALLS.**

(See Table 1.)

- a. Inspect core engine module for stall damage per table 1.

Table 1. Inspection and Corrective Action for Engine Stall

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
1. Disassemble engine	1. Disassemble engine as follows: a. Remove core engine module. b. Remove rear compressor drive turbine and No. 1 bearing c. Remove 4th through 7th stage compressor case, 10th through 13th stage stators, and No. 2 bearing assembly.	a. T.O. 2J-F100-53-5, WP 134 00 b. T.O. 2J-F100-53-7, WP 011 00 c. T.O. 2J-F100-53-7, WP 014 00	

**NOTE**

Corrective action for vanes and blades differs for the following configurations:

- 7th through 12th stage vanes with PWA 279 abradable
- 7th through 12th stage vanes with PWA 284 abradable

For superseding and superseded parts, refer to WP 036 00.

2. Inspect core engine module	2. Inspect core engine module for high pressure compressor deterioration as follows: a. 4th through 7th stage tip shrouds.	a. T.O. 2J-F100-53-7, SWP 388 01	a. If over limits, replace part(s).
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Table 1. Inspection and Corrective Action for Engine Stall (continued)

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
	b. 7th through 12th stage stators.	b. T.O. 2J-F100-53-7, SWP 352 01 and SWP 355 01	b. If stators have PWA 279 abradable, do not inspect; send to repair for PWA 284 abradable upgrade. If stators have PWA 284 abradable, and are over limits, replace part(s).
	c. 4th through 13th stage blades.	c. T.O. 2J-F100-53-7, SWP 374 01	c. If 4th through 7th stage blade is over limits, replace blade(s). If 7th through 12th stage stators have PWA 284 abradable, and if 8th through 13th stage blade is over limits, replace blade(s). If 7th through 12th stage stators have PWA 279 abradable, send 8th through 13th stage blades to repair for CBN tip coating upgrade.

Table 1. Inspection and Corrective Action for Engine Stall (continued)

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
3. Assemble engine	<p>3. Assemble engine as follows:</p> <p>a. Assemble 4th through 7th stage compressor case, 10th through 13th stage stators and No. 2 bearing assembly.</p> <p>b. Assemble rear compressor drive turbine and No. 4 bearing.</p> <p>c. Reidentify core engine module.</p> <p>d. Install core engine module.</p>	<p>a. T.O. 2J-F100-53-7, WP 701 00</p> <p>b. T.O. 2J-F100-53-8, WP 701 00</p> <p>c. WP 036 00</p> <p>d. T.O. 2J-F100-53-5, WP 700 00</p>	

# WORK PACKAGE

## TECHNICAL PROCEDURES

PWA 284 ABRADABLE UPGRADE  
FOR 7TH THROUGH 12TH STAGE COMPRESSOR  
STATORS WITH PWA 279 ABRADABLE -

## UNSCHEDULED MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

## LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

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**REFERENCE MATERIAL REQUIRED**

<b>Title</b>	<b>Number</b>
Engine - - - - -	T.O. 2J-F100-53-5
Core Engine Module - Removal - - - - -	WP 134 00
Module and Fan Ducts Installation - - - - -	WP 700 00
Core Engine Module - - - - -	T.O. 2J-F100-53-7
Core Engine Module - Dismantling (Rear) - - - - -	WP 011 00
Core Engine Module - Dismantling (Front) - - - - -	WP 014 00
Stator Segment, Compressor, Tenth Through Twelfth Stage Assembly - Inspection After Volcanic Ash Ingestion - - - - -	SWP 352 01
Stator Segments, Compressor, Seventh Through Ninth Stage Assemblies - Inspection After Volcanic Ash Ingestion - - - - -	SWP 355 01
Blades, Compressor Rotor. Fourth Through Thirteenth Stage and Fourth Through Seventh Stage Blade Locks - Inspection After Volcanic Ash Ingestion - - - - -	SWP 374 01
Duct Segment, Compressor, Fourth, Fifth, Sixth and Seventh Stage - Inspection After Volcanic Ash Ingestion - - - - -	SWP 388 01
Core Engine Module - Final Assembly (Front) - - - - -	WP 701 00
Rear Compressor Drive Turbine - - - - -	T.O. 2J-F100-53-8
Rear Compressor Drive Turbine - Final Assembly - - - - -	WP 701 00

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

None

**EXPENDABLE ITEMS**

None

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None



**1. INTRODUCTION.**

(See Table 1.)

- a. This work package contains guidelines for upgrading engines and core engine modules containing PWA 279 abradable in the 7th through 12th stage compressor stators, with PWA 284 abradable. See table 1.

- b. Corrective action consists of inspecting compressor, and reoperating and replacing affected parts.

**Table 1. Upgrade PWA 279 to PWA 284 Abradable**

	<b>PWA 279 ABRADABLE</b> (Part Removed)	<b>PWA 284 ABRADABLE</b> (Part Installed)
<b>NOMENCLATURE</b>	<b>P/N</b>	<b>P/N</b>
7th stage stator	4077077-01/04 4079087-01/04 4080497-01/04	4077877-01/02 4078277-01/02 4080737-01/02
8th stage stator	4077078-01/05 4079088-01/05	4077878-01/03 4078348-01/03 4080738-01/05
9th stage stator	4077079-01/03 4079089-01/03 4078349-01/03 4080179-01/03	4077879-01/03 4080739-01/03
10-12th stage stator	4077920-01/04 4080030-01/04	4077880-01/04
8th stage blade	4075608-01/04 4077508-01/04	* 4079308-01/04
9th stage blade	4075609-01/04 4077509-01/04	* 4079309-01/04
10th stage blade	4075610-01/04 4077510-01/04	* 4079310-01/04
11th stage blade	4075611-01/04 4077511-01/04	* 4079411-01/04
12th stage blade	4075612-01/04 4077512-01/04	* 4079412-01/04
13th stage blade	4075613-01/04 4077513-01/04	* 4079413-01/04
* With CBN tip coating		

**2. UPGRADE ENGINE AND CORE ENGINE MODULE.**

(See Table 2.)

- a. Upgrade per table 2.

**Table 2. PWA 279 Abradable Upgrade to PWA 284 Abradable**

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
1. Disassemble engine	1. Disassemble engine as follows: a. Remove core engine module. b. Remove rear compressor drive turbine and No. 1 bearing. c. Remove 4th through 7th stage compressor case, 10th through 13th stage stators, and No. 2 bearing assembly.	a. T.O. 2J-F100-53-5, WP 134 00 b. T.O. 2J-F100-53-7, WP 011 00 c. T.O. 2J-F100-53-7, WP 014 00	
2. Inspect core engine module	2. Inspect high pressure compressor as follows: a. 4th through 7th stage tip shrouds.	a. T.O. 2J-F100-53-7, SWP 388 01	a. If over limits, replace part(s).

Table 2. PWA 279 Abradable Upgrade to PWA 284 Abradable (continued)

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
	b. 7th through 12th stage stators.	b. T.O. 2J-F100-53-7, SWP 352 01 and SWP 355 01	b. If stators have PWA 279 abradable, do not inspect; send to repair for PWA 284 abradable upgrade. If stators have PWA 284 abradable and are over limits, replace part(s).
	c. 4th through 13th stage blades.	c. T.O. 2J-F100-53-7, SWP 374 01	c. If 4th through 7th stage blade is over limits, replace blade(s). If 7th through 12th stage stators have PWA 284 abradable, and if 8th through 13th stage blade is over limits, replace blade(s). If 7th through 12th stage stators have PWA 279 abradable, send 8th through 13th stage blades to repair for CBN tip coating upgrade.

Table 2. PWA 279 Abradable Upgrade to PWA 284 Abradable (continued)

Engine/Module	Area Task	T.O./ WP Reference	Corrective Action
3. Assemble engine	3. Assemble engine as follows:		
	<p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>7th through 12th stage stators shall have PWA 284 abradable.</li> <li>8th through 13th stage blades shall have CBN tip coating.</li> </ul>		
	a. Assemble 4th through 7th stage compressor case, 10th through 13th stage stators and No. 2 bearing assembly.	a. T.O. 2J-F100-53-7, WP 701 00	
	b. Assemble rear compressor drive turbine and No. 4 bearing.	b. T.O. 2J-F100-53-8, WP 701 00	
	c. Reidentify core engine module as follows:		
	Core Engine Module PN		
	Reidentified PWA 279 Coated Configuration	Original PWA 279 or Upgrade PWA 284 Coated Configuration	
	4082657-800	4068722-800	
	4082657-801	4068722-801	
	4082657-803	4068722-803	
	4082657-806	4068722-806	
	4082657-807	4068722-807	
	d. Install core engine module.	d. T.O. 2J-F100-53-5, WP 700 00	

**WORK PACKAGE**

**TECHNICAL PROCEDURES**

**EXCESSIVE ENGINE VIBRATION DUE TO SEVERE MODULE DISTRESS**

**EFFECTIVITY: ENGINE MODEL F100-PW-229**

**LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 4

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REFERENCE MATERIAL REQUIRED

Title	Number
Depot Engine Accessories and Rigging Procedures - - - - -	T.O. 2J-F100-53-4
Control - Fuel, Main - - - - -	WP 009 00
Cylinder - Actuating, Linear, Variable Vane, Compressor	
Inlet - - - - -	WP 037 00
Depot Engine - - - - -	T.O. 2J-F100-53-5
Tube, Hose, Clamp, and Manifold Assemblies;Engine	
External - Inspection and Repair - - - - -	WP 062 00
Depot Core Engine Module - - - - -	T.O. 2J-F100-53-7
Core Engine Module - Final Assembly (Rear) - - - - -	WP 706 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

## 1. INTRODUCTION.

- a. This work package provides recommended depot maintenance guidelines for engines rejected for excessive vibration due to severe module distress.  
(See Table 1).

## 2. PRELIMINARY INSPECTIONS.

- a. Modules not being removed as part of the vibration investigation will be processed as on condition maintenance (OCM) assets.

## 3. MAINTENANCE PROCEDURES.

- a. Engines inducted into depot maintenance rejected for excessive vibration due to severe module distress shall have maintenance and inspections accomplished as outlined in table 1.
- b. Depot maintenance procedures for the complete engine, in T.O. 2J-F100-53-5, are written for vertical assembly or disassembly. Fault isolation, investigation and correction of vibration problems will often be accomplished utilizing horizontal assembly or disassembly procedures.

**Table 1. Maintenance For Engines Rejected For Excessive Vibration  
Due To Severe Module Distress**

Step	Procedure	T.O./WP Reference
1.	Inspect tube and manifold assemblies.	2J-F100-53-5, WP 062 00.
2.	Inspect main fuel manifold brackets for cracks.	2J-F100-53-5, WP 062 00.
3.	Replace left and right main fuel manifolds, fuel supply tubes and clamps.	2J-F100-53-7, WP 706 00.
4.	Replace diffuser case assembly No. 4 bearing internal oil supply tube for suspect high cycle fatigue.	2J-F100-53-7, WP 706 00.
5.	Replace CIVV clevis rod ends.	2J-F100-53-4, WP 037 00.
6.	Replace Main Fuel Control to inspect power lever angle shaft for any crack indications or fracture.	2J-F100-53-4, WP 009 00.



# WORK PACKAGE

## TECHNICAL PROCEDURES

VANE AND SUPPORT ASSEMBLY, TURBINE STATOR, FIRST STAGE -

OCM INSPECTION WHEN ASSEMBLY IS REMOVED TO FACILITATE OTHER  
MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

## LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 20

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**REFERENCE MATERIAL REQUIRED**

<b>Title</b>	<b>Number</b>
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Depot Introduction and General Information - - - - -	T.O. 2J-F100-53-1
General Repair Procedures - Grinding, Blending, Lapping, Buffing, and Peening - - - - -	WP 091 00
Depot on Condition Maintenance - - - - -	T.O. 2J-F100-53-2
Depot Core Engine Module - - - - -	T.O. 2J-F100-53-7
Support Assembly, First Stage Turbine Stator - Inspection - - - - -	WP 359 00
Vane Assemblies, Turbine Stator, First Stage - Inspection - - - - -	WP 360 00
Core Engine Module - Final Assembly (Rear) - - - - -	WP 706 00

**APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS**

None

**CONSUMABLE MATERIALS**

<b>Nomenclature</b>	<b>Specification/Vendor Part Number</b>
ABRASIVE PAPER, SILICON CARBIDE	600 GRIT
CLOTH, ABRASIVE, CROCUS	P-C-458
MARKER	DIXON REDI-SHARP, BLACK
PENCIL, SILVER, METAL MARKING	COLORBRITE NO 2102, VERITHIN 753 OR GENERAL PENCIL COLOR TEX SILVER NO 1843

**EXPENDABLE ITEMS**

<b>Nomenclature</b>	<b>Part Number</b>	<b>Quantity</b>
NUT-SELF-LOCKING, HEX	4082753-01	8
PIN-RIVET-THREADED, SLAB	4077452	8

**APPLICABLE SUPPORT EQUIPMENT**

None

**ILLUSTRATED SUPPORT EQUIPMENT**

None

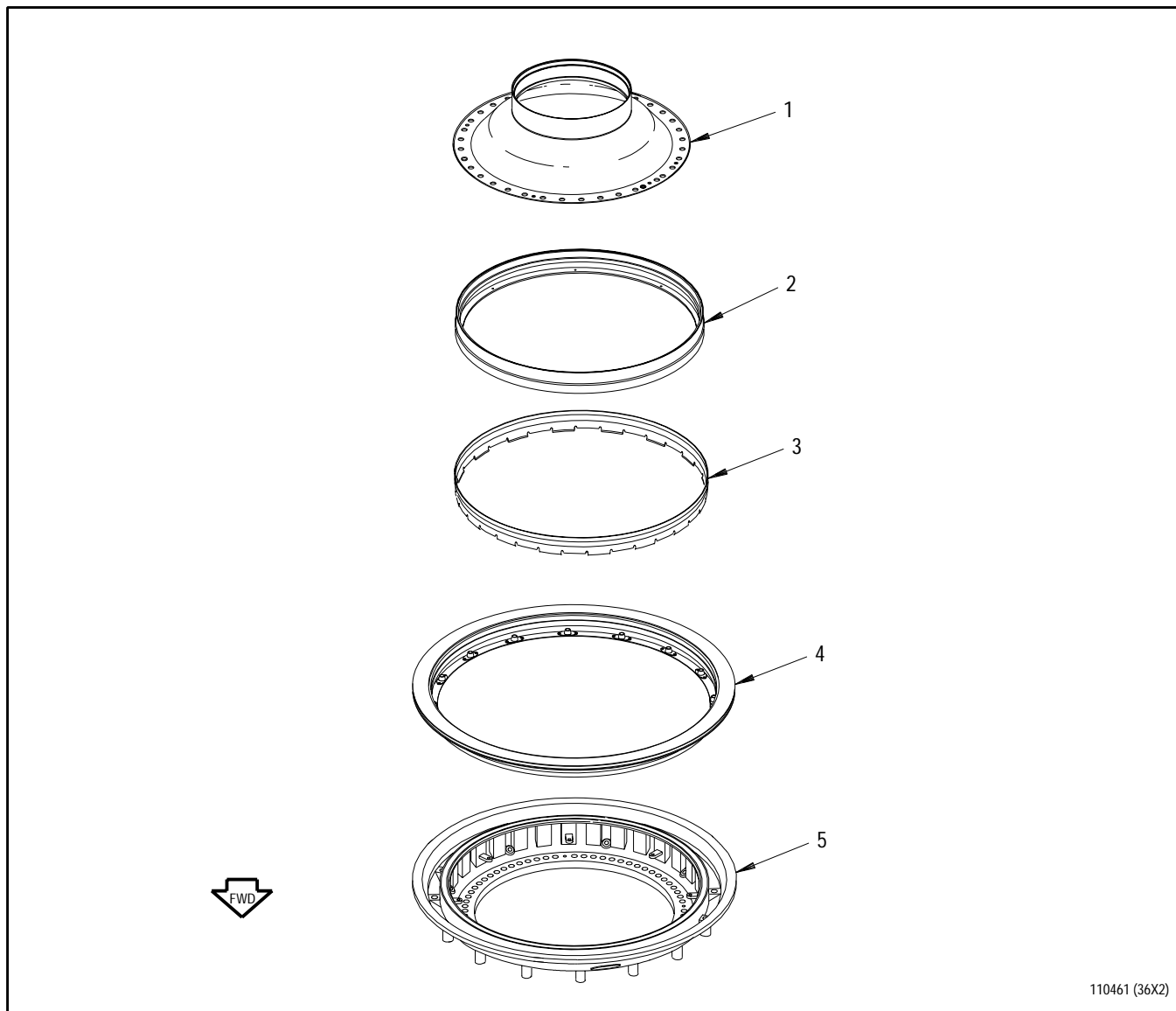
## 1. INTRODUCTION.

- a. This work package provides visual inspection requirements of exposed engine parts following removal of first stage turbine vane and support assembly to facilitate other maintenance.
- b. Purpose of inspection is to determine if assembly is serviceable, or must be repaired. The intent is to only disassemble as required to replace or repair parts due to being beyond serviceable limits or driven by time compliance technical order (TCTO).

## 2. INSPECTION FOLLOWING REMOVAL OF FIRST STAGE TURBINE VANE AND SUPPORT ASSEMBLY.

(See Figures 1 through 7.)

- a. First stage vanes are removed during TOBI/combustor disassembly, and may be inspected in detail.
- b. Inspect first stage vanes per figure 2.
- c. The turbine support, TOBI, and honeycomb seals may be inspected as an assembly.
- d. Inspect TOBI aft face and honeycomb seals per figures 3 through 7.
- e. Inspect TOBI forward face per figure 7.
- f. Some limits are provided for use if TOBI/seal assembly is disassembled. Full disassembly for sole purpose of a hidden part inspection is not required.



1. First stage turbine inner air sealing ring (bore seal) - see figure 6
2. First stage turbine air sealing ring - see figure 4
3. First stage turbine air sealing ring support - see figure 5
4. First stage turbine outer air sealing ring - see figure 3
5. First stage turbine stator support - see figure 7

**Figure 1. First Stage Turbine Ring and Support Assembly (TOBI Duct) Parts - General**

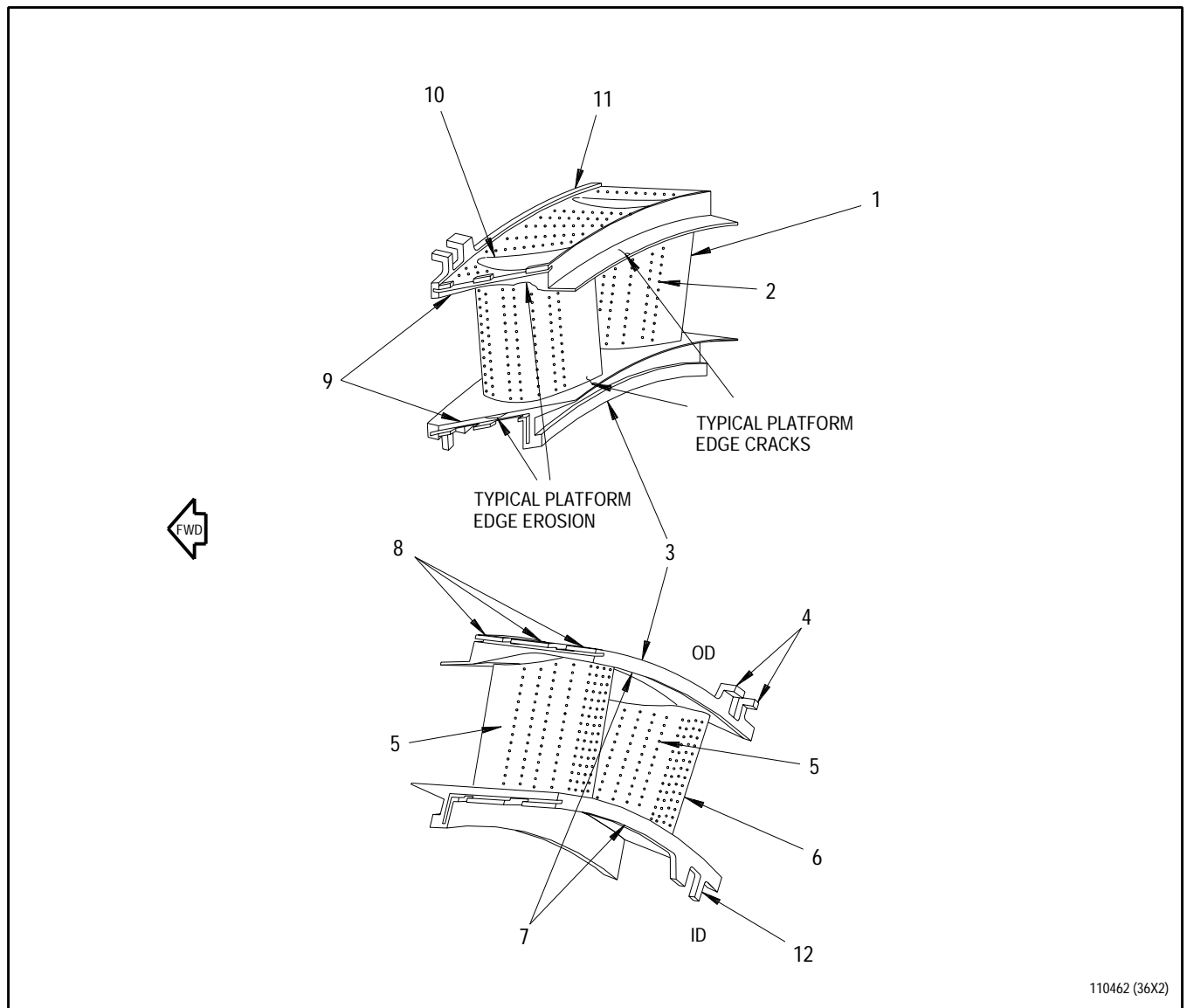


Figure 2. First Stage Turbine Stator Vane Assemblies - Inspection

## Legend for figure 2

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action.
1. Trailing edge -			
Erosion	Any amount of surface erosion provided no burn-through. Erosion associated with cracking allowed up to 0.020 inch through width.	See corrective action	Replace vane assembly.
Cracks	Any amount provided through width is less than 0.020 inch.	See corrective action	Replace vane assembly.
Nicks and dents	See Index 11, All over limits.	-	-
2. Airfoil - convex side -			
Erosion	Up to 0.010 inch depth	See corrective action	Replace vane assembly.
Cracks	Any amount provided internal cavity is not exposed.	See corrective action	Replace vane assembly.
Foreign matter splatter	0.010 inch height, provided no holes blocked.	See corrective action	
Nicks and dents	See Index 11, All over limits.	-	-

## Legend for figure 2 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action.
3. Platform ID and OD -			
Cracks	Any amount provided through-width is less than 0.020 inch.	See corrective action	Replace vane assembly.
Erosion	Half of local thickness.	See corrective action	Replace vane assembly.
ID trailing edge platform rub (non-gaspath side only).	Any amount.	See corrective action	Replace vane assembly.
4. Vane foot -			
Missing	Not serviceable.	See corrective action	Replace vane assembly.
Wear	0.010 inch depth.	See corrective action	Replace vane assembly.
Cracks	Not serviceable.	See corrective action	Replace vane assembly.
5. Airfoils - concave side -			
Erosion	0.010 inch depth	See corrective action	Replace vane assembly.
Cracks	Any amount provided internal cavity is not exposed.	See corrective action	Replace vane assembly.
Foreign matter splatter	0.010 inch height, provided no holes blocked.	See corrective action	Replace vane assembly.
Nicks and dents	See Index 11, All over limits.	-	-

## Legend for figure 2 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action.
6. Leading edge - Erosion	0.020 inch depth, full span	See corrective action	Replace vane assembly.
Cracks	Any amount provided internal cavity is not exposed.	See corrective action	Replace vane assembly.
Nicks and dents	See Index 11, All over limits.	-	-
Foreign material splatter	0.010 inch height, provided no holes blocked.	See corrective action	Replace vane assembly.
Blocked cooling holes	Serviceable provided local erosion is within limits.	See corrective action	
7. Leading edge buttress - ID and OD wear from combustor/ seal contact	a. Up to 0.005 inch depth, any length, but not across full width of buttress face.	See corrective action	Replace vane assembly.
8. Seal retaining lug - Missing	Not serviceable	See corrective action	Replace vane assembly.
Cracks	Not serviceable	See corrective action	Replace vane assembly.
Wear	0.005 inch depth.	See corrective action	Replace vane assembly.



## Legend for figure 2 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action.
9. Platform edge - Erosion with or without cracks	Half of local thickness	See corrective action	Replace vane assembly.
Cracks	Any amount and length provided through-width is less than 0.020 inch.	See corrective action	Replace vane assembly.
10. Cooling air tube welded area - Cracks	Any number, up to 0.125 inch length.	See corrective action	Replace vane assembly.
11. All over - Chipped or crazed coating	Serviceable.	-	-
Flaking, peeling, or blistered coating	Not serviceable.	See corrective action	Replace vane assembly.
Nicks, dents	Any amount up to 0.015 inch maximum surface dimension and depth. Five locations per airfoil, up to 0.100 inch maximum surface dimension and 0.060 inch depth. All indications must be clearly separated. No cracks allowed.	See corrective action	Replace vane assembly.
12. Keyhole slot - Cracks	Serviceable.	-	-

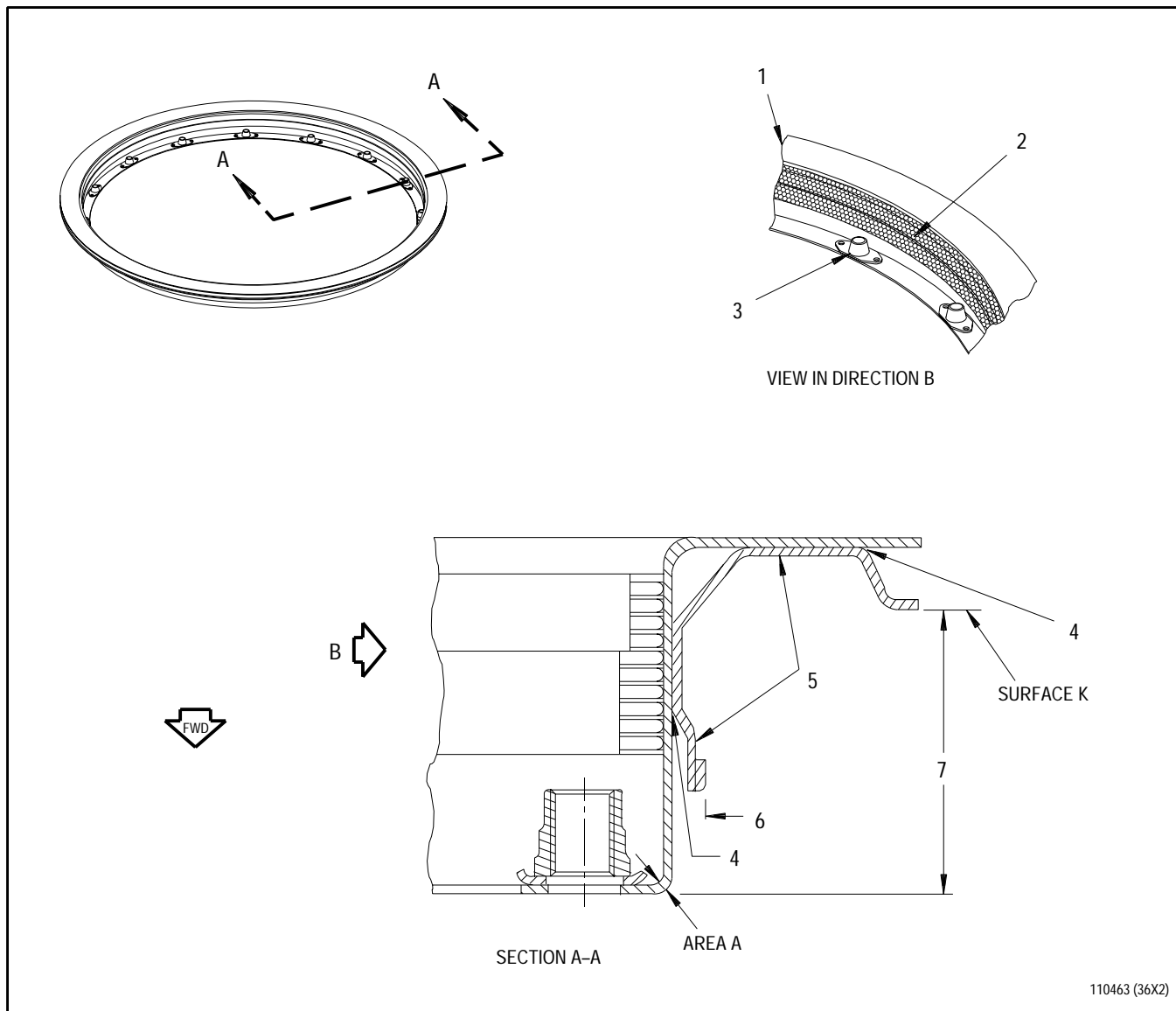


Figure 3. First Stage Turbine Outer Air Sealing Ring - Inspection

## Legend for figure 3

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action.
1. All over- Cracks, not in honeycomb braze or area A	Not serviceable	Up to 0.500 inch length and 0.020 inch width	Stop drill ends of cracks using 0.062 inch diameter drill (cobalt drill recommended). Replace air seal ring.
Cracks in honeycomb braze or area A	Not serviceable	See corrective action	Replace air seal ring.
Separation of details	Not serviceable	See corrective action	Replace air seal ring.
2. Honeycomb - Damaged or missing cells	Up to 0.375 inch width and 0.750 inch circumferential length. Areas shall be separated by 1.000 inch minimum. No more than 2% of total honeycomb area may be affected.	See corrective action	Replace air seal ring. Hold for future repair.
Wear, grooving	Up to 0.040 inch depth for full circumference.	See corrective action	Replace air seal ring. Hold for future repair.
3. Nut plate - Damaged or stripped threads	Not serviceable.	See corrective action	Replace nut plate. Refer to T.O. 2J-F100-53-7, WP 459 00.
4. Braze joints - Missing braze	Not serviceable.	See corrective action	Replace air seal ring.

## Legend for figure 3 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
5. Sheetmetal details -			
Nicks and dents, not on surface K	0.060 inch depth.	See corrective action	Replace air seal ring.
Nicks and dents, on surface K	0.020 inch depth.	See corrective action	Replace air seal ring.
6. Dimension C			
Wear	18.102 inches minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace air seal ring.
7. Dimension Y			
Axial step	1.065 inches maximum. Not required unless air seal ring is removed.	See corrective action	Replace air seal ring.

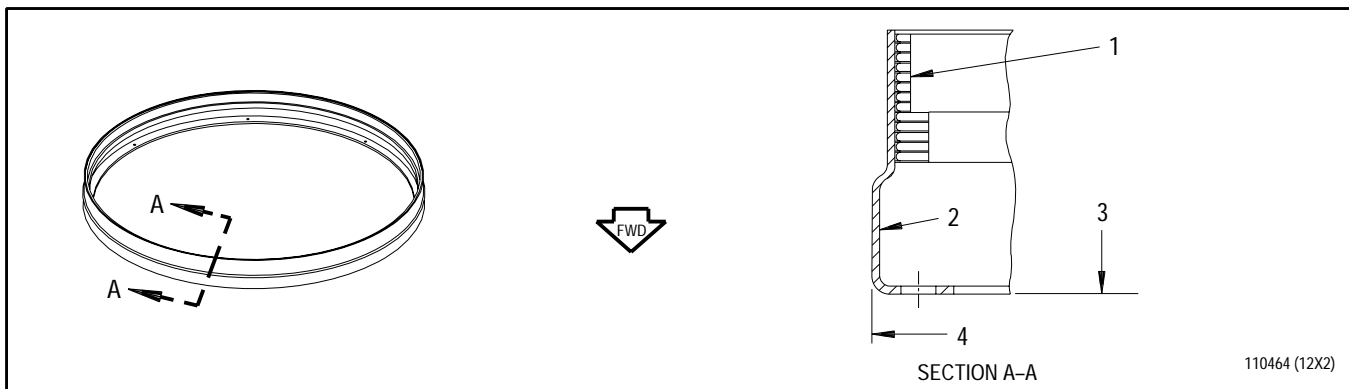
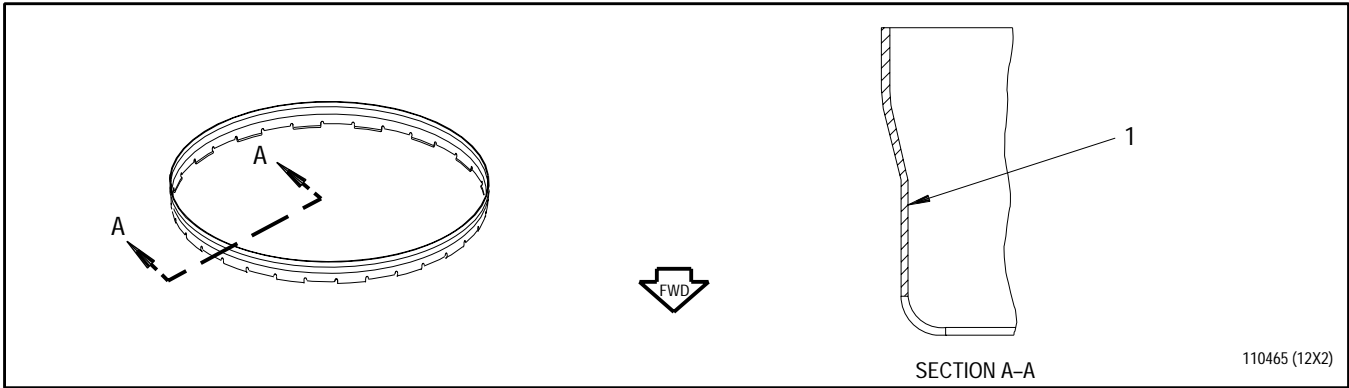


Figure 4. First Stage Turbine Air Sealing Ring - Inspection

## Legend for figure 4

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Honeycomb -			
Damaged or missing cells	Up to 0.375 inch width and 0.750 inch circumferential length. Areas shall be separated by 1.000 inch minimum. No more than 2% of total honeycomb area may be affected.	See corrective action.	Replace air seal ring. Hold for future repair.
Wear, grooving	0.040 inch depth for full circumference.	See corrective action	Replace air seal ring. Hold for future repair.
2. Backplate -			
Local distortion and dents	0.040 inch depth.	See corrective action	Replace air seal ring.
Cracks	Not serviceable.	See corrective action	Replace air seal ring.
Nicks and scratches	0.015 inch depth.	See corrective action	Replace air seal ring.
3. Surface C -			
Local distortion and dents	0.040 inch depth	See corrective action	Replace air seal ring.
Cracks	Not serviceable.	See corrective action	Replace air seal ring.
4. Diameter M -			
Wear	15.357 inches minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace air seal ring.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over-			
Local distortion and dents	0.040 inch depth.	See corrective action	Replace air seal support.
Cracks	Not serviceable.	See corrective action	Replace air seal support.
Nicks and scratches	0.015 inch depth.	See corrective action	Replace air seal support.

Figure 5. First Stage Turbine Air Sealing Ring Support - Inspection

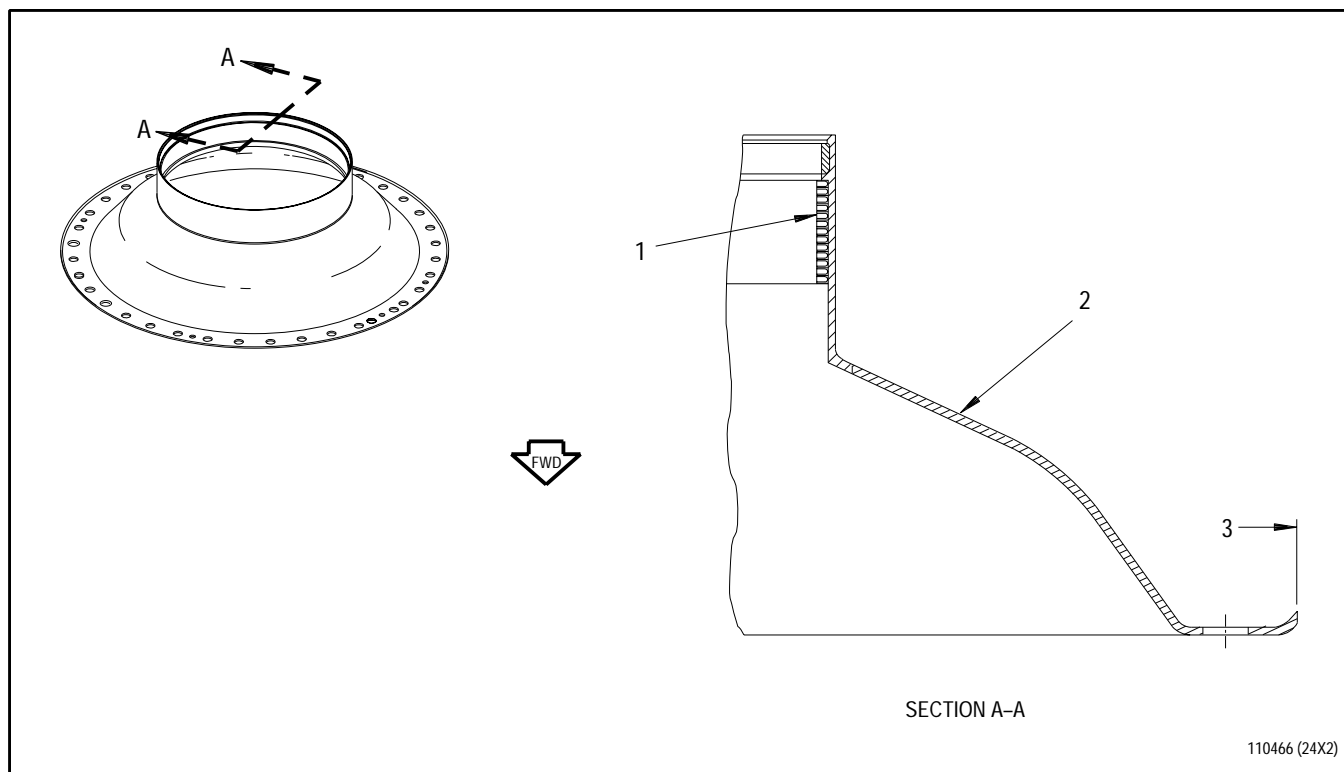
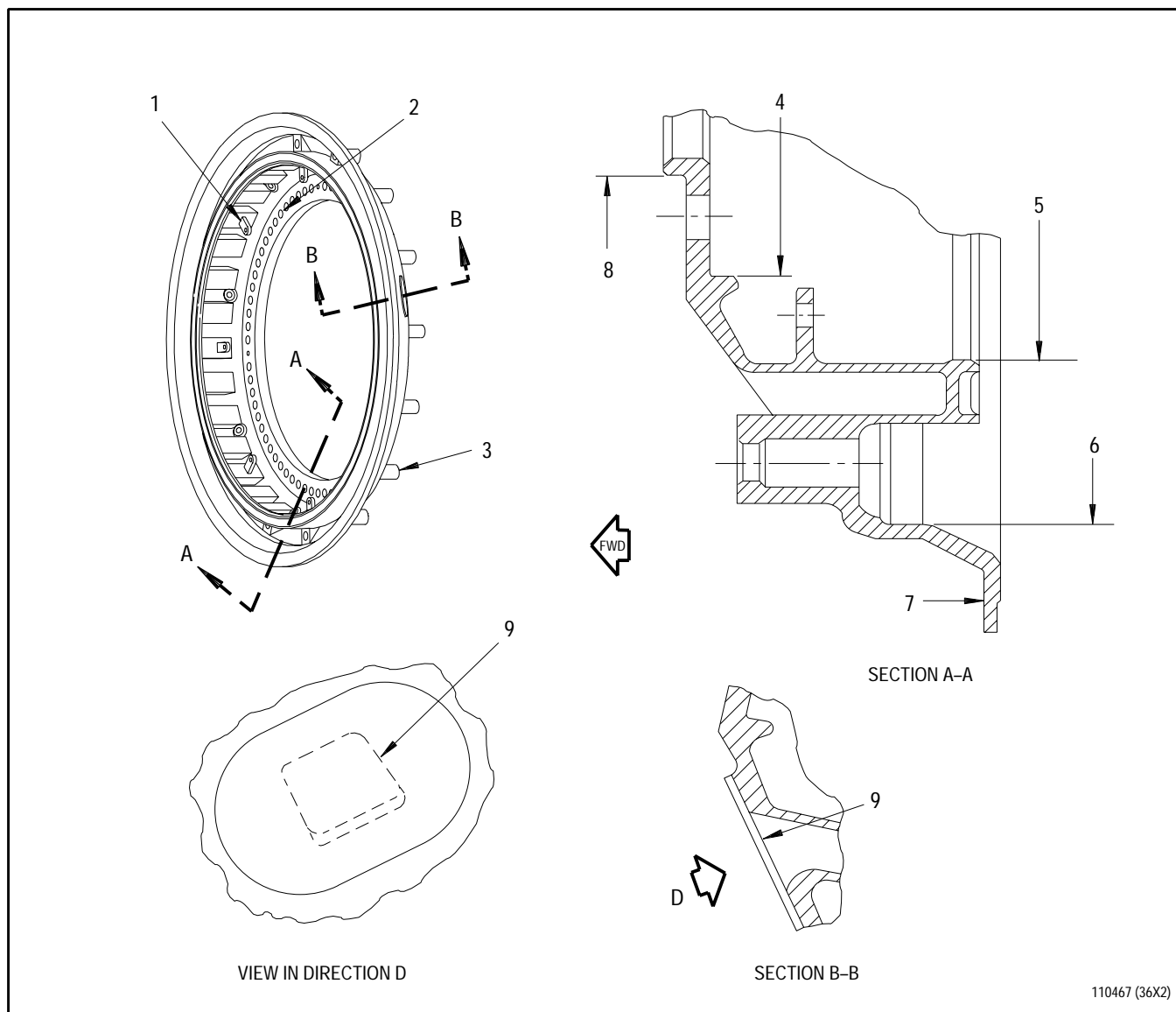


Figure 6. First Stage Turbine Inner Air Sealing Ring - Inspection

## Legend for figure 6

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Honeycomb -			
Damaged or missing cells	0.375 inch width and 0.750 inch circumferential length. Areas shall be separated by 1.000 inch minimum. No more than 2% of total honeycomb area may be affected.	See corrective action.	Replace air seal ring. Hold for future repair.
Wear, grooving	0.020 inch depth for full circumference.	See corrective action.	Replace air seal ring. Hold for future repair.
2. Support			
Nicks and dents	0.015 inch depth.	See corrective action.	Replace air seal ring.
Cracks	Not serviceable	See corrective action.	Replace air seal ring.
3. Diameter M -			
Wear	14.311 inches minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action.	Replace air seal ring.





**Figure 7. First Stage Turbine Stator Support - Inspection**

## Legend for figure 7

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Inner lugs -			
Nicks and dents	0.005 inch depth.	See corrective action	Remove raised metal and pick up using fine stone. Refer to T.O. 2-1-111.
Cracks	Not serviceable	See corrective action	Replace turbine support assembly.
Missing	Not serviceable	See corrective action	Replace turbine support assembly.
2. Threaded holes -			
Stripped threads	Not serviceable	See corrective action	Replace turbine support assembly. Hold for future repair.
3. All over, except lugs -			
Nicks, dents, chips, scratches	0.015 inch depth	0.031 inch depth	Remove raised metal and pick up using fine stone. Refer to T.O. 2-1-111.
Cracks	Not serviceable	See corrective action	Replace turbine support assembly.

## Legend for figure 7 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
4. Diameter AF -  Wear or chipped coating	Refer to T.O. 2J-F100-53-7, WP 801 00, Reference 3281. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace turbine support assembly.
5. Diameter AJ -  Wear or chipped coating	Refer to T.O. 2J-F100-53-7, WP 801 00, Reference 3241. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace turbine support assembly.
6. Diameter AN -  Wear or chipped coating	Refer to T.O. 2J-F100-53-7, WP 801 00, Reference 3240. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace turbine support assembly.
7. Surface L -  Wear	0.010 inch depth.	See corrective action	Replace turbine support assembly. Hold for future repair.

## Legend for figure 7 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
8. Diameter AG -  Wear or chipped coating	Refer to T.O. 2J-F100-53-7, WP 801 00, Reference 3232. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace turbine support assembly.
9. Seal or seal rivets -  Missing	Not serviceable.	See corrective action	Replace turbine support assembly. Hold for future repair.
Loose	80% contact with surface J and 0.003 inch maximum gap.	See corrective action	Replace turbine support assembly. Hold for future repair.

# WORK PACKAGE

## TECHNICAL PROCEDURES

### REAR COMPRESSOR DRIVE TURBINE ROTOR AND STATOR ASSEMBLY

### OCM INSPECTION WHEN ASSEMBLY IS REMOVED TO FACILITATE OTHER MAINTENANCE

EFFECTIVITY: ENGINE MODEL F100-PW-229

## LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 88

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 88					
		28			

## REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Depot Introduction and General Information - - - - -	T.O. 2J-F100-53-1
General Repair Procedures - Grinding, Blending, Lapping, Buffing, and Peening - - - - -	WP 091 00
Depot Core Engine Module - - - - -	T.O. 2J-F100-53-7

## APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T. O. No.	Date	Level	Title (ECP No.)
2J-F100229(VI)-507	27 FEB 95	O/I	REMOVE AND REPLACE FIRST TURBINE DUCT AND SUPPORT SET TO PROVIDE INCREASED COOLING AND HIGHER MARGIN MATERIAL FIRST DUCT SEGMENTS, F100-PW-229 ENGINES, F-15/F-16 AIRCRAFT (ECP 94QA197)
2J-F100229(VI)-515	01 APR 96	D	INSTALLATION OF HIGH PRESSURE TURBINE 1-2 SPACER DAMPER PN 4082885 TO PREVENT MISINSTALLATION, F100-PW-229 ENGINES, F-15/F-16 AIRCRAFT (ECP 94QA114C1)

## CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
CONTACT CLEANER SOLVENT	MIL-C-81302-D
ETCH SOLUTION, KALLINGS	ASTM STANDARD E407 NO. 94
ABRASIVE PAPER, SILICON CARBIDE	600 GRIT
CLOTH, ABRASIVE, CROCUS	P-C-458
MARKER	DIXON REDI-SHARP, BLACK
PENCIL, SILVER, METAL MARKING	COLORBRITE NO 2102, VERITHIN 753 OR GENERAL PENCIL COLOR TEX SILVER NO 1843

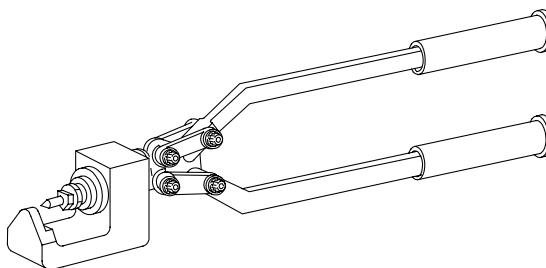
### EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
NUT-SELF-LOCKING, HEX	4082753-01	8
PIN-RIVET-THREADED, SLAB	4077452	8

### APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
9	REAR COMPRESSOR DRIVE TURBINE ROTOR - COUNTERWEIGHT INSPECTION	
	RIVETER, 1ST AND 2ND STAGE TURBINE DISKS BALANCE	
	COUNTERWEIGHT RIVET - - - - -	PWA 51171

### ILLUSTRATED SUPPORT EQUIPMENT



PWA 51171-C

**Figure T1. PWA 51171 RIVETER**

**1. INTRODUCTION.**

- a. This work package provides visual inspection requirements of exposed engine parts following removal of rear compressor drive turbine rotor and stator assembly to facilitate other maintenance.
- b. Purpose of inspection is to determine if assembly is serviceable, or must be repaired. The intent is to only disassemble as required to replace or repair parts due to being beyond serviceable limits or driven by Time Compliance Technical Order (TCTO).

**2. INSPECTION FOLLOWING REMOVAL OF REAR COMPRESSOR DRIVE TURBINE ROTOR AND STATOR ASSEMBLY.**

(See Figures 1 through 18.)

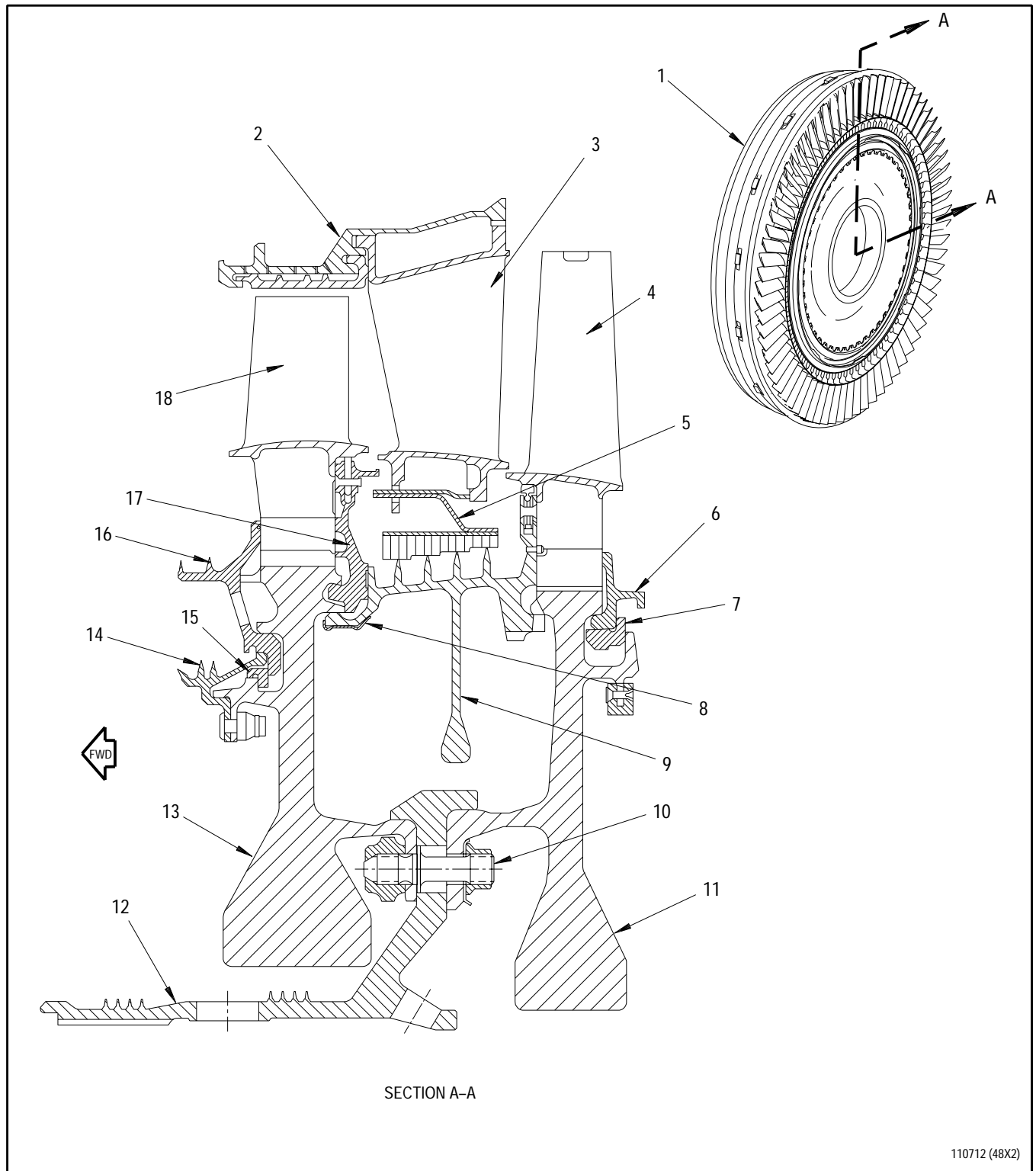
- a. Inspect front area of rear compressor drive turbine rotor and stator assembly per figures 1, 2, 4, 6, 7, 8 (part is mostly hidden), 9, 11, and 12.
- b. Measure 2nd stage blade set tip diameter before any disassembly.
- c. Inspect rear area of rear compressor drive turbine rotor and stator assembly per figures 1, 9, 11, 12, 14 (part is mostly hidden), 15, 16, 17, and 18.
- d. The remaining figures/limits are provided for use if the module is disassembled. Full disassembly for the sole purpose of a hidden part inspection is not required.

- e. If any 1st or 2nd stage turbine blades are broken proceed as follows:

- (1) Replace main fuel manifolds. Refer to T.O. 2J-F100-53-7. Tag manifolds with tag "REJECTED DUE TO SUSPECTED HIGH CYCLE FATIGUE CAUSED BY OPERATION OF HIGH PRESSURE TURBINE WITH BROKEN BLADES".
- (2) Replace No. 4 oil supply tube. Refer to T.O. 2J-F100-53-7. Tag tube with tag "REJECTED DUE TO SUSPECTED HIGH CYCLE FATIGUE CAUSED BY OPERATION OF HIGH PRESSURE TURBINE WITH BROKEN BLADES".

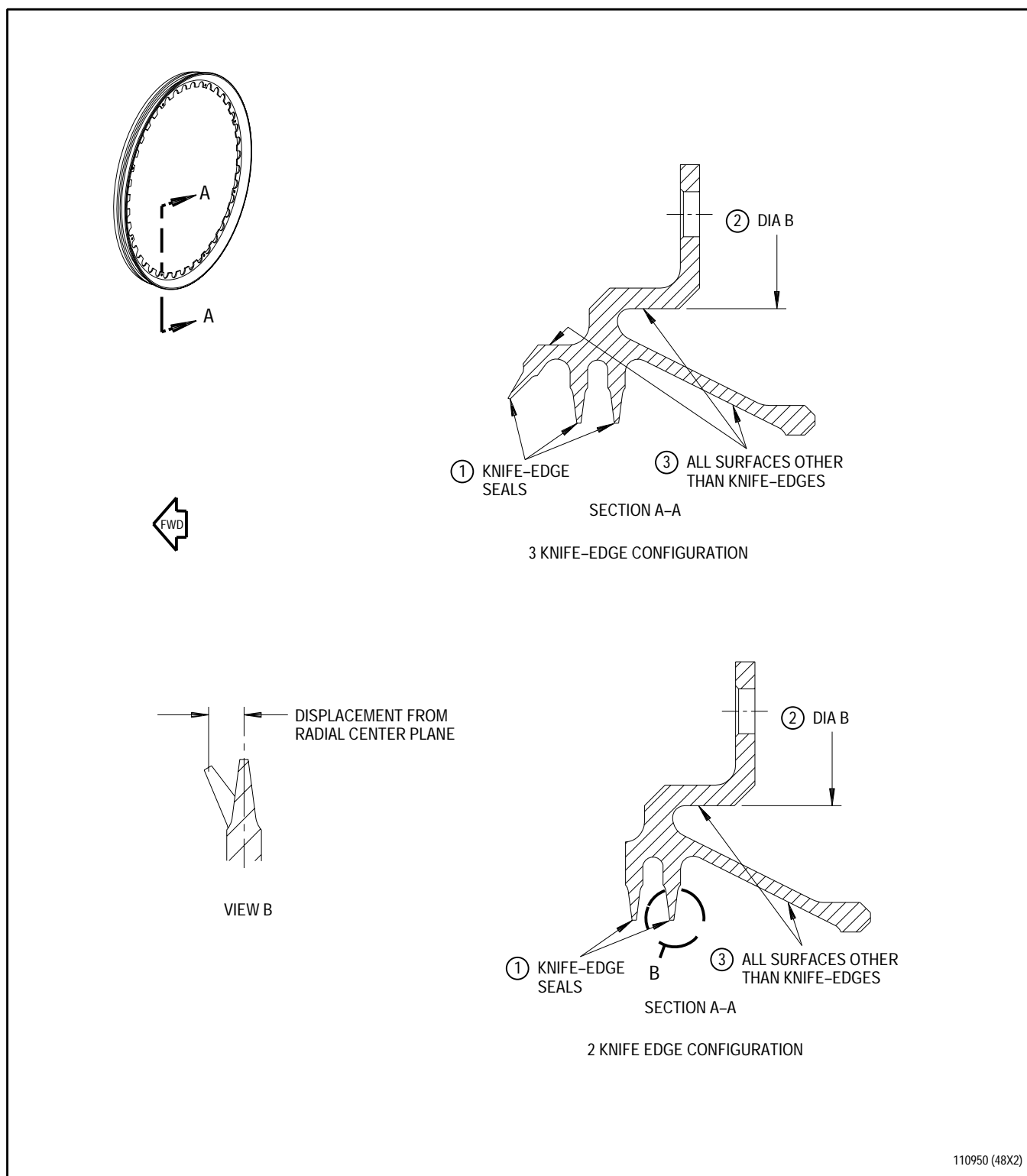
- f. Refer to T.O. 2J-F100-53-8, WP 011 00 for module disassembly.
- g. Refer to T.O. 2J-F100-53-8, WP 701 00 for module assembly.
- h. Refer to T.O. 2J-F100-53-8, WP 702 00 to balance the module.



**Figure 1. Rear Compressor Drive Turbine**

**Legend for figure 1**

- |  |  |
|--|--|
| 1. Rear compressor drive turbine rotor and stator assembly | 10. Tierod, turbine  |
| 2. Duct and support set, turbine, 1st stage                | 11. Disk, turbine, 2nd stage                                   |
| 3. Vane, turbine stator, 2nd stage                         | 12. Rub assembly, turbine, front                               |
| 4. Blade, turbine rotor, 2nd stage                         | 13. Disk, turbine, 1st stage                                   |
| 5. Ring assembly, air sealing, turbine, 2nd stage          | 14. Seal, air, turbine 1st stage                               |
| 6. Plate, retaining, blade turbine, rear, 2nd stage        | 15. Spacer, turbine air seal                                   |
| 7. Ring, turbine blade retaining plate                     | 16. Plate, retaining, blade, turbine front, 1st stage          |
| 8. Damper, turbine blade retaining plate                   | 17. Plate assembly, retaining, blade, turbine, rear, 1st stage |
| 9. Plate assembly, retaining, blade, turbine, 2nd stage    | 18. Blade, turbine rotor, 1st stage                            |



110950 (48X2)

Figure 2. First Stage Turbine Air Seal - Inspection

## Legend for figure 2

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
--------------------------------	-------------------------------	------------------------------	-------------------

## NOTE

Some air seals only have the two rear knife-edges.

## 1. Knife-edge seals -

Wear	0.010 inch per diameter. Refer to T.O. 2J-F100-53-8, WP 801 00, reference 3029. Not required if knife-edge has any tip coating present.	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8.
Bent, rolled without cracks (Displacement from radial center plane - View B)	0.500 inch length per knife-edge. Do not straighten.	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8. Hold for future repair
Chipped/ missing coating	Top coat may be missing up to 30% of surface area.  Base coat may be chipped or missing in up to six 0.250 inch areas - shall be separated by at least one inch per knife-edge.  Any amount up to 0.050 inch long.	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8. Hold for future repair

## Legend for figure 2 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Knife-edge seals - (continued)			
Nicks, dents	0.005 inch depth	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8. Hold for future repair - requires knife-edge coating strip, blend, and recoat.
Cracks	Not serviceable	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8
Foreign material deposits	Any amount serviceable.	-	-
2. Diameter B -			
Wear	13.987 inches minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8. Hold for future repair.
3. Other surfaces -			
Dents, nicks	Not serviceable	0.005 inch depth	Blend repair or replace air seal. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8

## Legend for figure 2 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
4. Scalloped flange parallelism -			
a. Pin rivet tangs - 8 locations			
Bent or cracked	Not serviceable	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8.
b. Block-off tangs - remaining locations			
Cracks	Not serviceable	See corrective action	Blend repair per paragraph 4 or replace air seal. Refer to T.O. 2J-F100-53-8.
Bent	0.020 inch forward out of plane, measured at ID	See corrective action	Blend repair per paragraph 4 or replace air seal. Refer to T.O. 2J-F100-53-8.
5. Pins and collars			
Loose	Not serviceable	See corrective action	Replace pin rivet and collar/nut. Refer to T.O. 2J-F100-53-8, WP 701 00 except use 0 to 30 pound-inch dial type torque wrench.
Damaged. missing	Not serviceable	See corrective action	Replace pin rivet and collar/nut. Refer to T.O. 2J-F100-53-8, WP 701 00 except use 0 to 30 pound-inch dial type torque wrench.

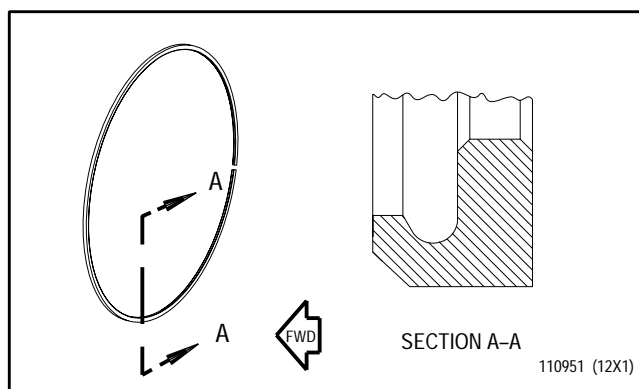


Figure 3. Turbine Air Seal Spacer - Inspection

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
<p style="text-align: center;"><b>NOTE</b></p> <p>Spacer is not inspected unless rear compressor drive turbine is disassembled to replace other hardware. Part is not visible with rear compressor drive turbine as an assembly.</p>			
1. All over - except outside surface -			
Cracks	Not serviceable	See corrective action	Replace spacer. Refer to T.O. 2J-F100-53-8.
Out-of-flat	0.050 inch	See corrective action	Replace spacer. Refer to T.O. 2J-F100-53-8.
Nicks, dents, and scratches	0.010 inch depth	One location up to 0.020 inch depth	Hand blend using fine stone to remove high metal.
2. Outside surface -			
Raised metal	Not serviceable	Any amount	Hand blend using fine stone to remove high metal.
Galling	Not serviceable	0.001 inch depth	Polish area to original finish of surrounding area.

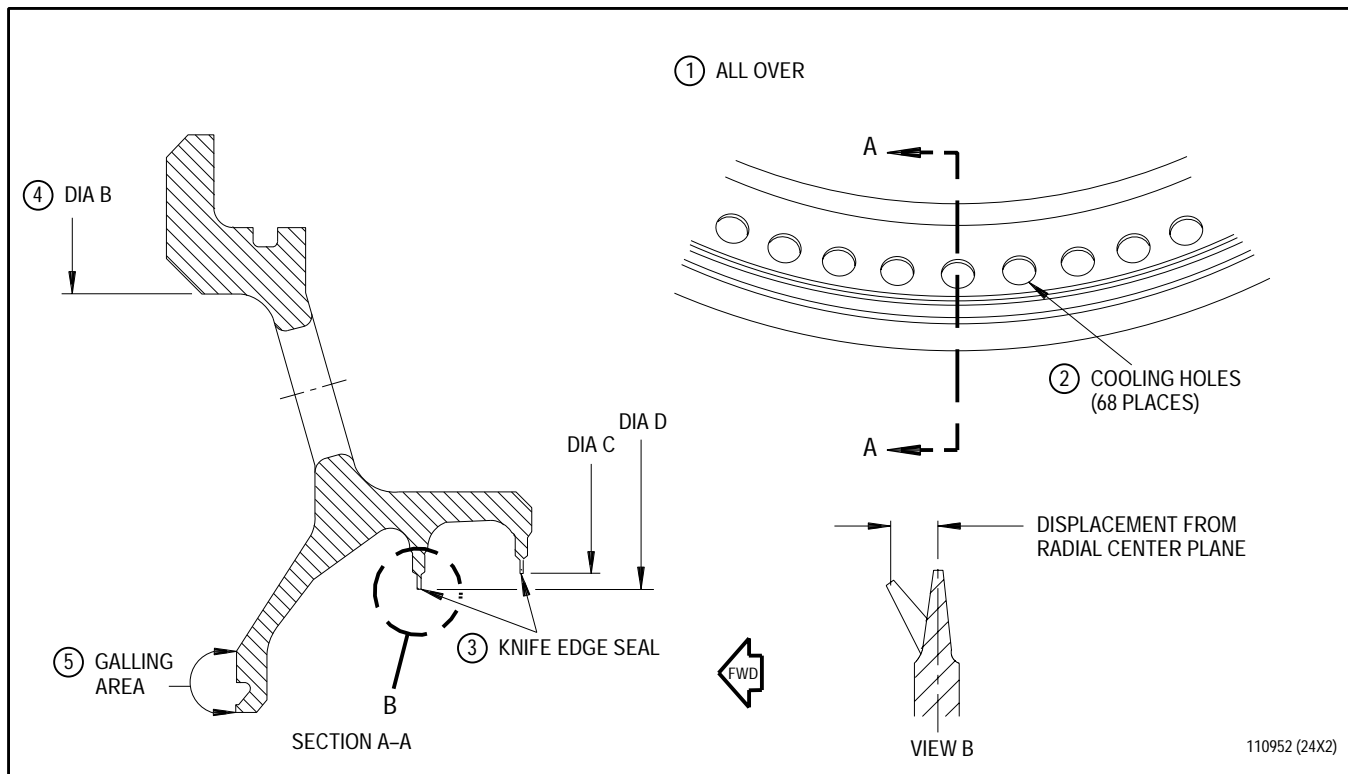


Figure 4. First Stage Turbine Blade Front Retaining Plate - Inspection

## Legend for figure 4

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over - except knife-edges -			
Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Nicks, dents, and scratches	Not serviceable	0.005 inch	Blend repair per paragraph 10 or replace retaining plate. Refer to T.O. 2J-F100-53-8.
	None allowed in cooling holes or ID/OD radii	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
2. Cooling holes -			
Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.

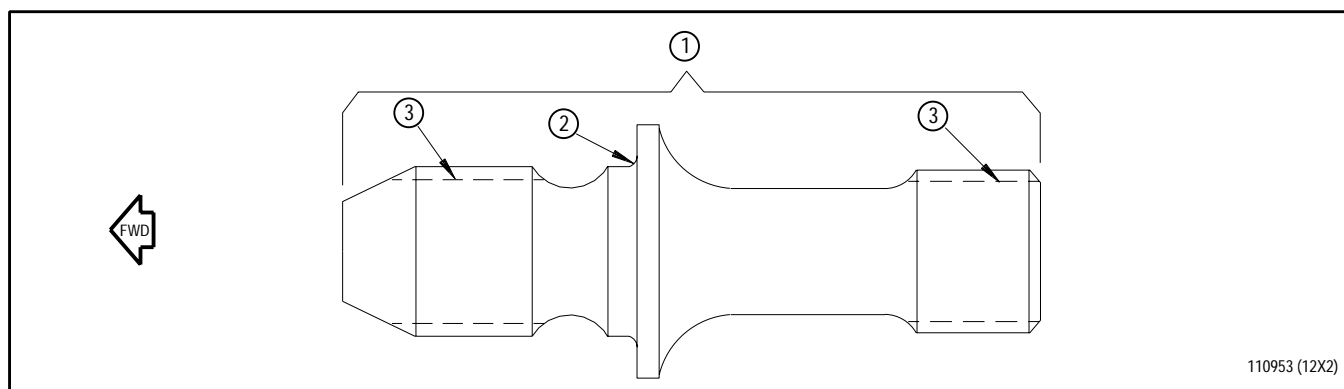


## Legend for figure 4 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Knife-edge seals -			
Wear	0.010 inch per diameter. Refer to T.O. 2J-F100-53-8, WP 801 00, reference 3030. Not required if knife-edge has any tip coating present.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8
Bent, rolled (without cracks)	0.500 inch length per knife-edge. Do not straighten.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8. Hold for future repair
Nicks, dents	0.005 inch depth	See corrective action	Replace air seal. Refer to T.O. 2J-F100-53-8. Hold for future repair - requires knife-edge coating strip, blend, and recoat.
Chipped coating	Top coat may be missing up to 30% of surface area	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8. Hold for future repair.
	Base coat may be chipped or missing in up to six 0.250 inch areas - shall be separated by at least one inch per knife-edge.  Any amount up to 0.050 inch long	See corrective action	

## Legend for figure 4 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Knife-edge seals - (continued)			
Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Foreign material deposits	Any amount serviceable	-	-
4. Diameter B -			
Wear	15.571 inches minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
5. Gallling area	0.002 inch depth	0.005 inch depth	Blend repair per paragraph 10 or replace retaining plate. Refer to T.O. 2J-F100-53-8.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Tierod -			
Stretch (check only when removed from disk)	1.597 inches maximum	See corrective action	Replace tierod. Refer to T.O. 2J-F100-53-8.
Bent	Not serviceable	See corrective action	Replace tierod. Refer to T.O. 2J-F100-53-8.
Tierod land - burrs, raised material	Not serviceable	See corrective action	Polish to original finish and fluorescent penetrant inspect per T.O. 2J-F100-9 or replace tierod. Refer to T.O. 2J-F100-53-8.
2. Nut mating faces -			
Burrs, raised material	Not serviceable	See corrective action	Polish to original finish or replace part. Refer to T.O. 2J-F100-53-8.
3. Tierod and nut threads cracked, damaged -	Not serviceable	See corrective action	Replace part. Refer to T.O. 2J-F100-53-8.

Figure 5. Rear Compressor Drive Turbine Tierod

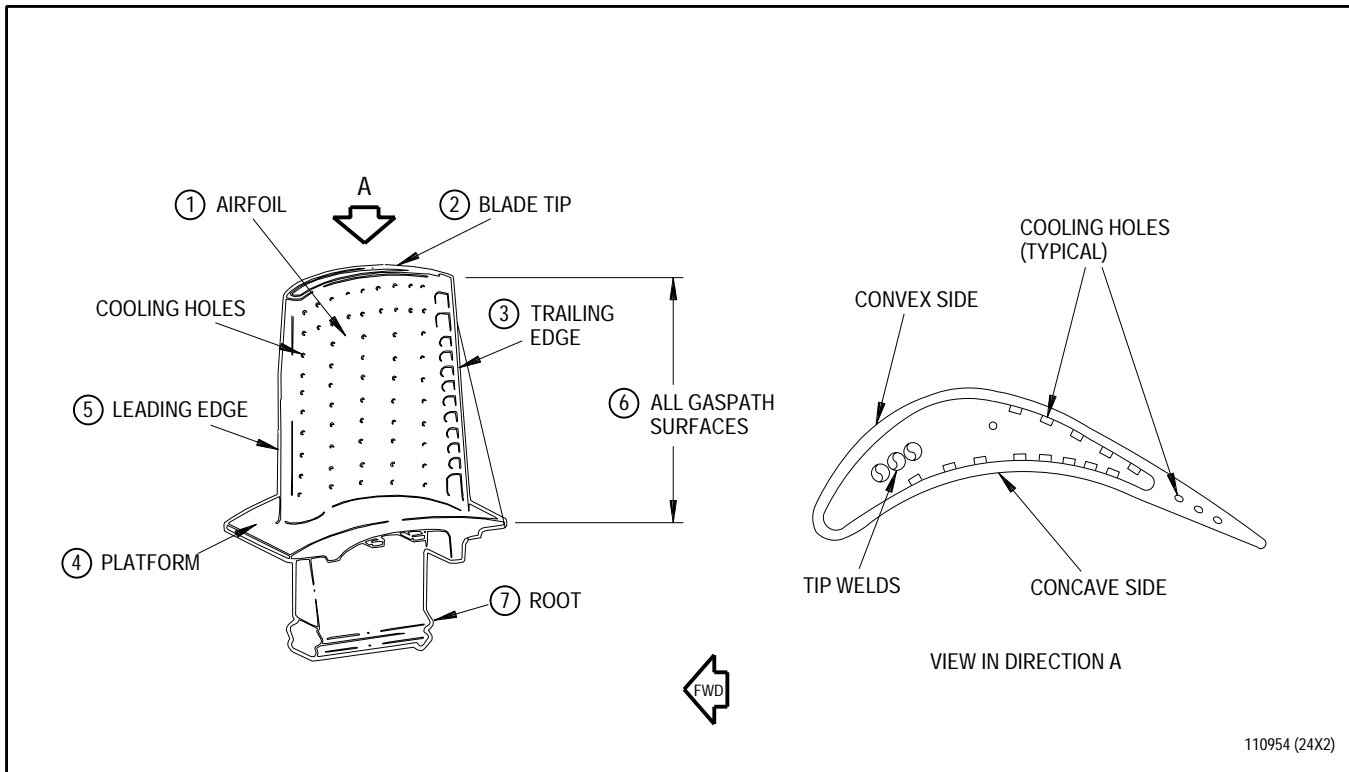


Figure 6. First Stage Turbine Blade - Inspection

## Legend for figure 6

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Airfoil -			
Foreign material splatter	0.010 inch height, provided no holes are blocked	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8. Clean if necessary. Refer to T.O. 2J-F100-53-8, WP 201 00.
Erosion	0.005 inch depth	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Nicks, dents	None allowed within 0.250 inch of platform.  Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and depth.  Two round bottomed dents per side up to 0.030 inch maximum surface dimension and depth.  All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks (pressure side)	Any amount of radial cracks, not connecting more than two cooling holes. No axial cracks.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

## Legend for figure 6 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
2. Blade tip -			
Worn or lost coating	Serviceable	-	-
Cracks	Five locations up to 0.100 inch each.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks in tip weld	Any amount within tip welds, not extending into parent material - no missing weld pieces.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Erosion	Any amount not extending below top row of shaped holes.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Rub	Serviceable provided entire tip pocket surface is not rubbed.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Nicks and dents	Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and depth.  Two round bottomed dents per side, up to 0.030 inch maximum surface dimension and depth.  All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cooling hole blockage or missing	Serviceable	-	-

## Legend for figure 6 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Trailing edge -			
Impact damage, nicks, and dents	None allowed within 0.250 inch of platform.  Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and depth.  Two round bottomed dents per side up to 0.030 inch maximum surface dimension and depth.  All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks	Any amount provided crack does not extend beyond trailing edge slot.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Erosion	0.020 inch depth measured from trailing edge.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
4. Platform -			
Outer surface: (Airfoil side)			
Rub	Grooving or wear is serviceable provided 0.050 inch minimum platform thickness remains at 0.150 inch aft of platform leading edge and rub does not extend into platform to airfoil leading edge radius.	See corrective action.	Replace blade. Refer to T.O. 2J-F100-53-8.
Erosion	0.010 inch depth	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

## Legend for figure 6 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
4. Platform -			
Outer surface: (Airfoil side) - (continued)			
Cracks - typically adjacent to concave airfoil surface	Any amount and length up to 0.020 inch width provided crack is not through platform or extending into platform to airfoil radius.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Inner surface: (Root side)			
Rub, grooving, or wear	Grooving or wear is serviceable provided 0.050 inch minimum platform thickness remains at 0.150 inch aft of platform leading edge and rub does not extend into platform to airfoil leading edge radius.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.



## Legend for figure 6 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
5. Leading edge -			
Erosion	0.010 inch depth	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks	Any amount of radial cracks not connecting more than two cooling holes.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Foreign material splatter	0.010 inch height		Replace blade. Refer to T.O. 2J-F100-53-8. Clean blade. Refer to T.O. 2J-F100-53-8, WP 201 00.
Impact damage, nicks and dents	None allowed within 0.250 inch of platform.  Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and depth.  Two round bottomed dents per side up to 0.030 inch maximum surface dimension and depth.  All indications must be clearly separated.	See corrective action	Replace blade.
Cooling hole blockage	Serviceable		

## Legend for figure 6 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
6. All gas path surfaces:			
Coating -			
Chipping	Serviceable	-	-
Flaking, peeling, or blistering	Not serviceable	See corrective action	Replace blades. Perform over temperature inspection. Refer to T.O. 2J-F100-53-8.
Crazing	Serviceable	-	-
Pits, porosity, or voids -	Serviceable	-	-
7. Root -			
Cracks	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

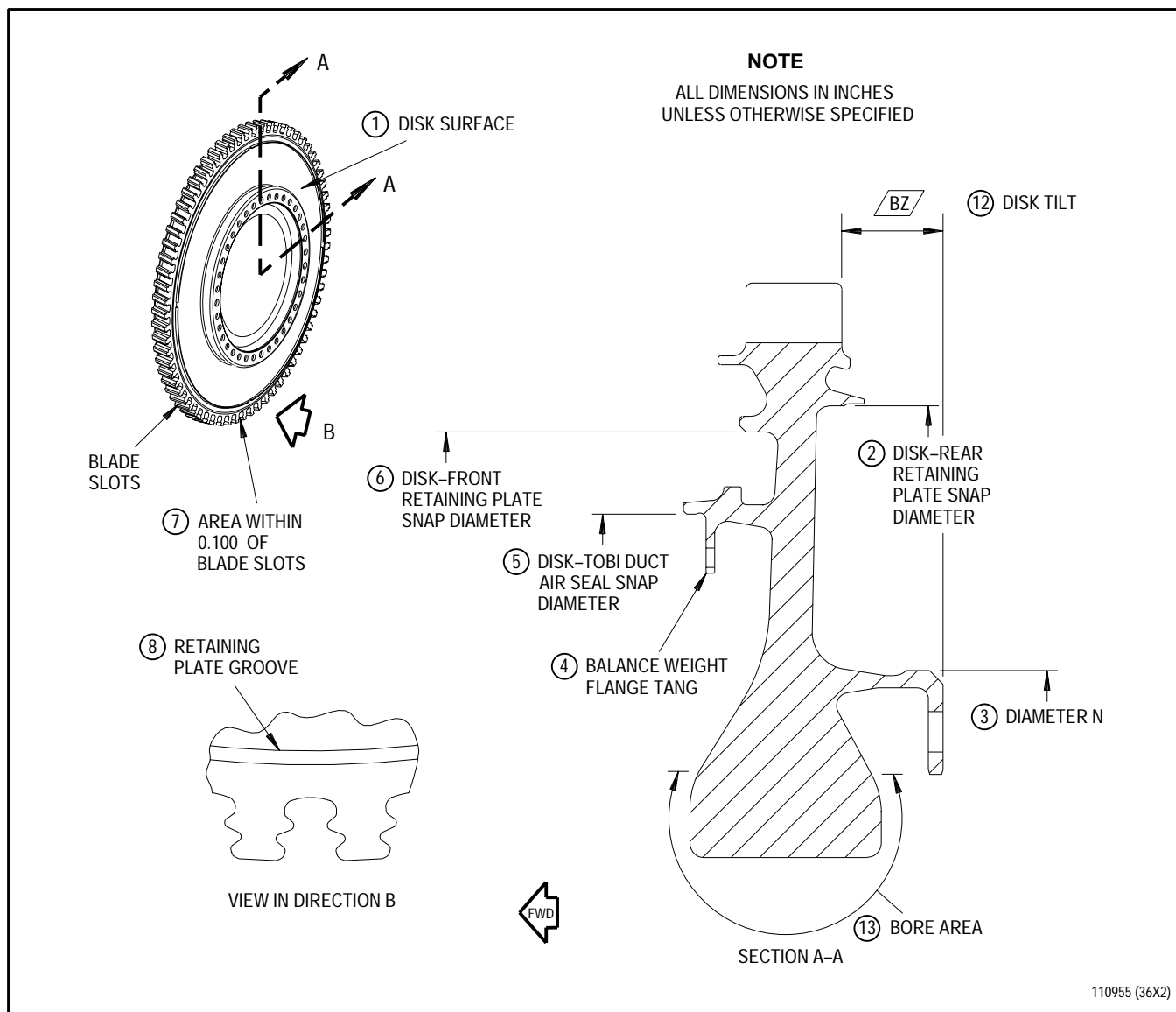


Figure 7. First Stage Turbine Disk - Inspection (Sheet 1 of 3)

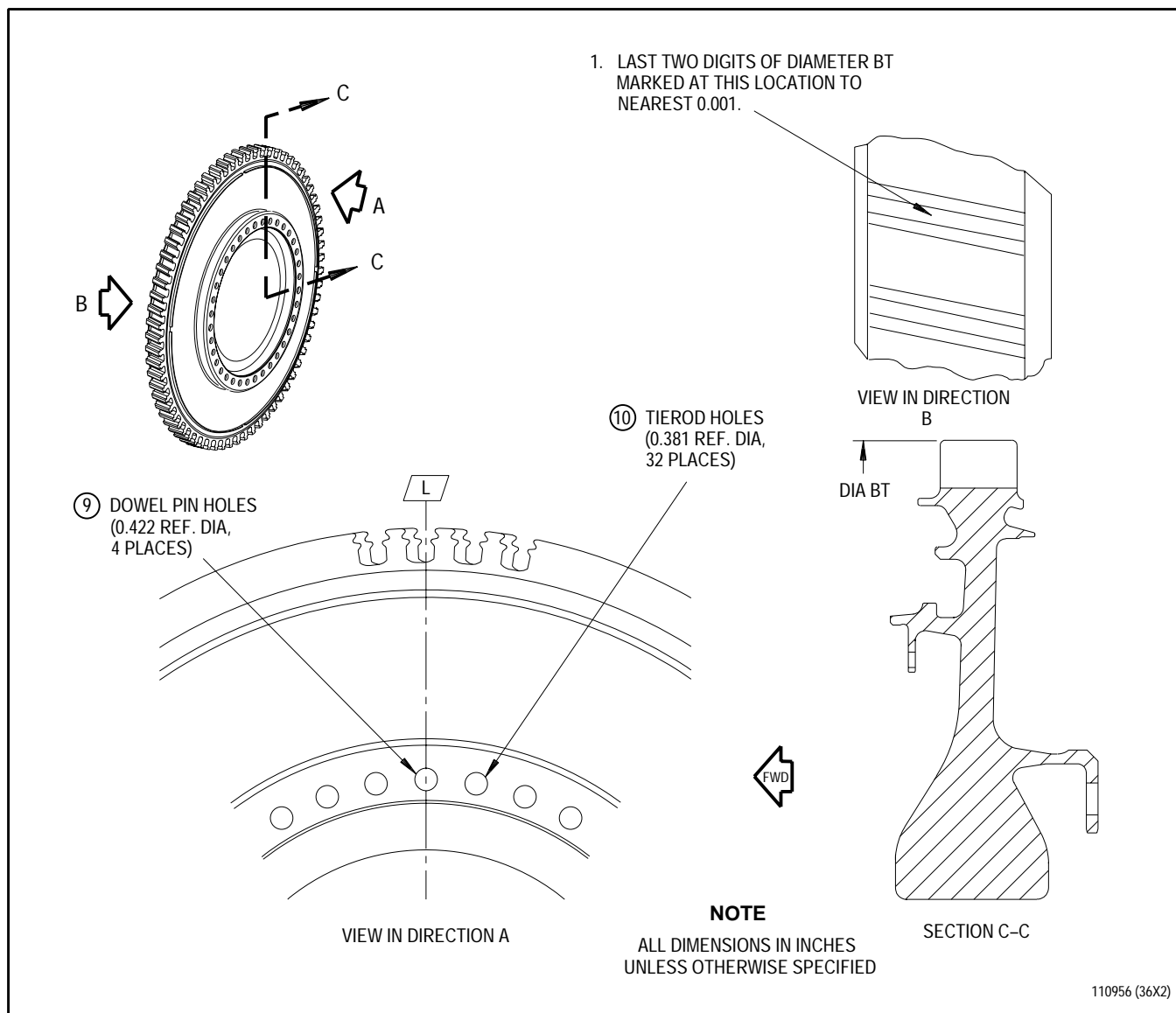


Figure 7. First Stage Turbine Disk - Inspection (Sheet 2 of 3)

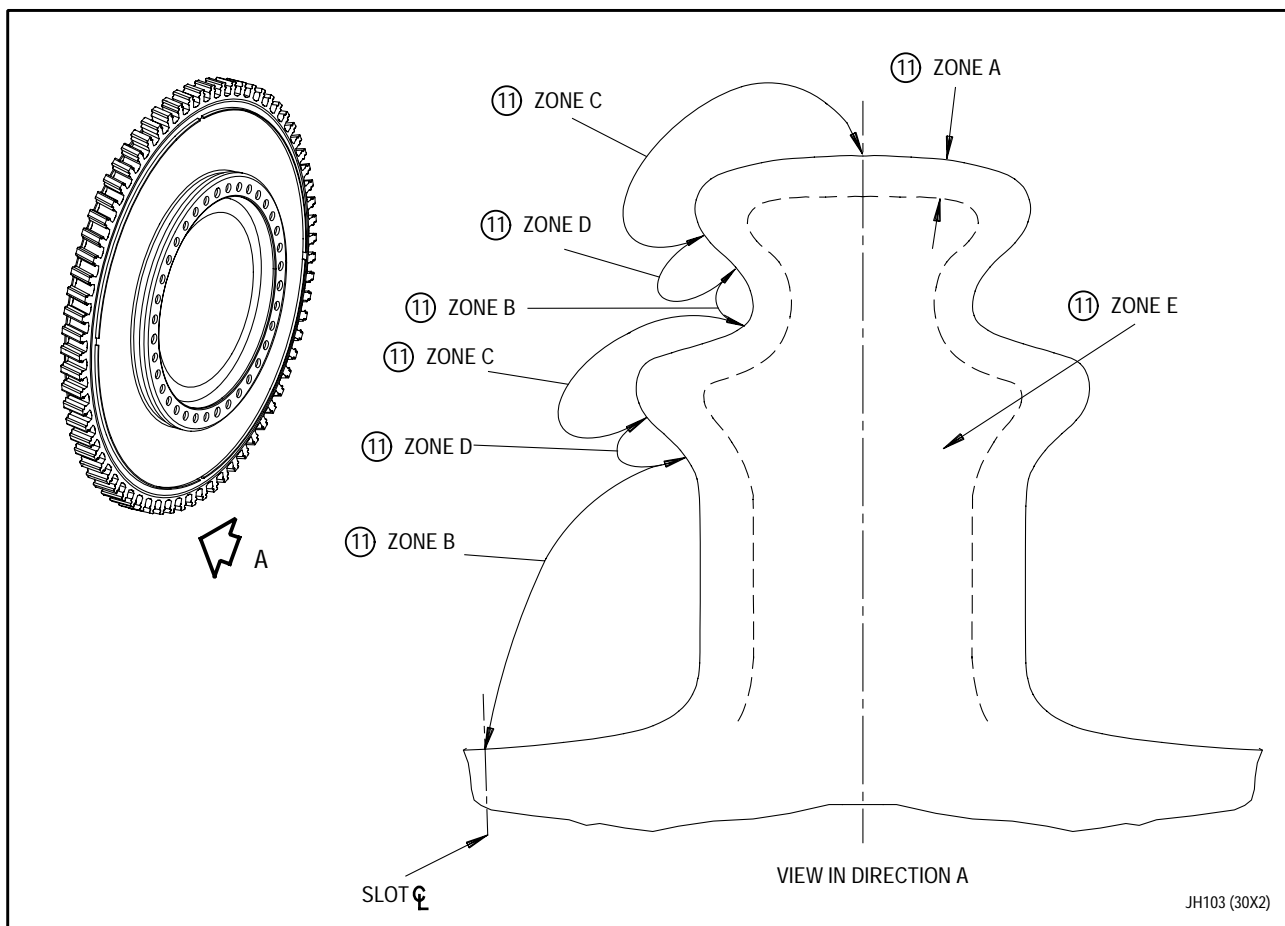


Figure 7. First Stage Turbine Disk - Inspection (Sheet 3 of 3)

## Legend for figure 7

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Disk surface (not within 0.100 inch of blade slots or fillet radii) -			
Cracks	Not serviceable	See corrective action.	Replace disk. Refer to T.O. 2J-F100-53-8.
Nicks, dents, and scratches	0.005 inch depth, smooth bottom and no sharp edges.	0.010 inch depth	Blend repair per paragraph 6 or replace disk. Refer to T.O. 2J-F100-53-8.
Corrosion	Not serviceable	0.002 inch depth over two square inches.	Hand polish using rubberized abrasive stone or abrasive paper 600 grit or finer or replace disk. Refer to T.O. 2J-F100-53-8.
2. Disk - rear retaining plate snap diameter -			
Wear	16.021 inch maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
3. Diameter N (hub snap) -			
Wear	10.987 inch minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.

## Legend for figure 7 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Scalloped flange tangs -			
<b>NOTE</b>			
Balance tang removal allowed up to four locations maximum - no adjacent locations.			
a. Balance weight tang -			
Cracked, broken, or sheared	Serviceable only if previously blended (check area missing material for smoothness).	See corrective action	Blend repair tang per paragraph 8 or replace disk. Refer to T.O. 2J-F100-53-8.
Bent	0.020 inch aft out of plane measured at ID. Do not reattach any weight.	See corrective action	Blend repair tang per paragraph 8 or replace disk. Refer to T.O. 2J-F100-53-8.
b. Combination pin rivet/balance weight tang (Eight locations) -			
Cracked, broken, or sheared	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Bent within 0.250 inch zone either side of pin rivet hole	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Bent beyond 0.250 inch zone either side of pin rivet hole	0.020 inch aft out of plane, measured at ID	See corrective action	Blend repair per paragraph 7 or replace disk. Refer to T.O. 2J-F100-53-8.

## Legend for figure 7 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
c. Balance weights -			
Improperly flared rivet	Not serviceable	See corrective action	Replace rivet per paragraph 9.
Missing, cracked	Not serviceable	See corrective action	If no other damage is noted, rebalance module. Refer to T.O. 2J-F100-53-8.
5. Disk TOBI duct air seal (ID knife-edge) snap diameter -			
Wear	13.970 inches maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
6. Disk-front retaining plate snap diameter -			
Wear	15.542 inches maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Refer to T.O. 2J-F100-53-8. Hold for future repair.



## Legend for figure 7 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
7. Area within 0.100 inch of blade slots or fillet radii -			
Cracks	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Nicks, dents, and scratches	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
8. Retaining plate groove -			
Cracked	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Nicks, dents, scratches	Not serviceable	0.005 inch depth	Blend repair or replace disk. Refer to T.O. 2J-F100-53-8.
9. Dowel pin holes 0.422 inch reference diameter -			
Cracked	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, and scratches	Not serviceable	See corrective action	Blend repair or replace disk. Refer to T.O. 2J-F100-53-8.
10. Tierod holes 0.381 inch reference diameter -			
Cracked	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, and scratches	Not serviceable	See corrective action	Blend repair or replace disk. Refer to T.O. 2J-F100-53-8.

## Legend for figure 7 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
11. Blade slot - Zones A through E - (Typical both sides)  Pits, nicks, dents, and scratches	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
12 Disk tilt -  Dimension BZ (From flange to disk lug)	Ref 0.980 inch maximum. Not required until scheduled depot visit.	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
13 Bore area -  Cracks	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Nicks, dents, and scratches	Not serviceable	0.003 inch depth	Blend repair per paragraph 6 or replace disk. Refer to T.O. 2J-F100-53-8.

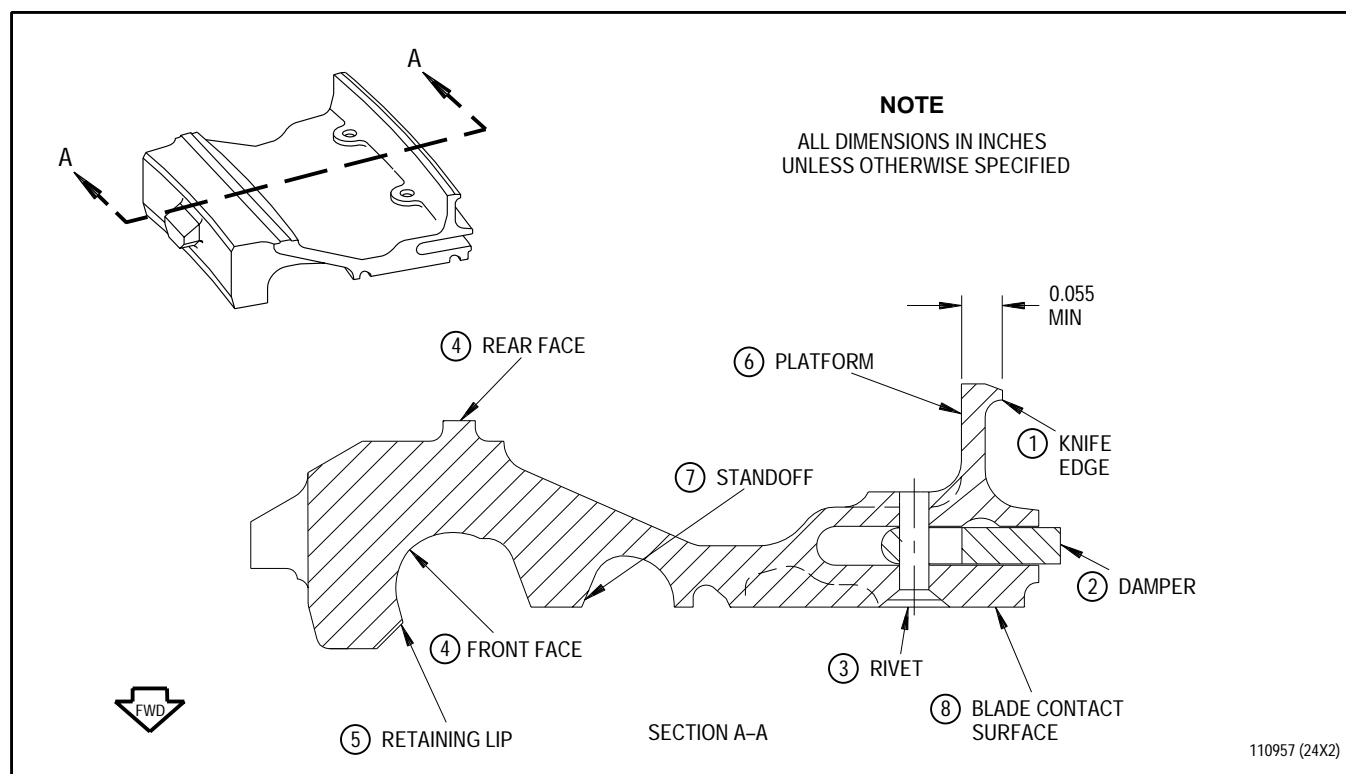


Figure 8. First Stage Turbine Blade Rear Retaining Plate Assembly

## Legend for figure 8

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
<b>NOTE</b>			
Cover plates are not inspected unless rear compressor drive turbine is disassembled to replace other hardware. Parts are not visible with rear compressor drive turbine as an assembly.			
1. Knife-edge -			
Rub	0.055 inch minimum	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
2. Damper -			
Worn	Up to 0.130 inch length across each flat in circumferential direction.	See corrective action	Replace damper. Refer to T.O. 2J-F100-53-8.
Missing, cracked	Not serviceable	See corrective action	Replace damper. Refer to T.O. 2J-F100-53-8.
Movement	Shall move freely	See corrective action	Replace damper. Refer to T.O. 2J-F100-53-8.

## Legend for figure 8 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Rivet - Cracked, missing	Not serviceable	See corrective action	Replace rivet. Refer to T.O. 2J-F100-53-8.
4. Front and rear face - Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Nonlinear indications	a. Four indications in one square inch, with none larger than 0.032 inch  b. One cluster maximum in two square inches, with cluster 0.125 inch long maximum, and not containing more than one indication of 0.015 inch diameter.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Front and rear face wear	0.002 inch depth	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
5. Retaining lip - Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
6. Platform - Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.

## Legend for figure 8 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
7. Standoff - Cracks	Any length on ID radius may wrap around sides up to 50% standoff thickness. None allowed on OD standoff face.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
8. Blade contact surface- Wear, galling	0.005 inch depth with no cracks.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.

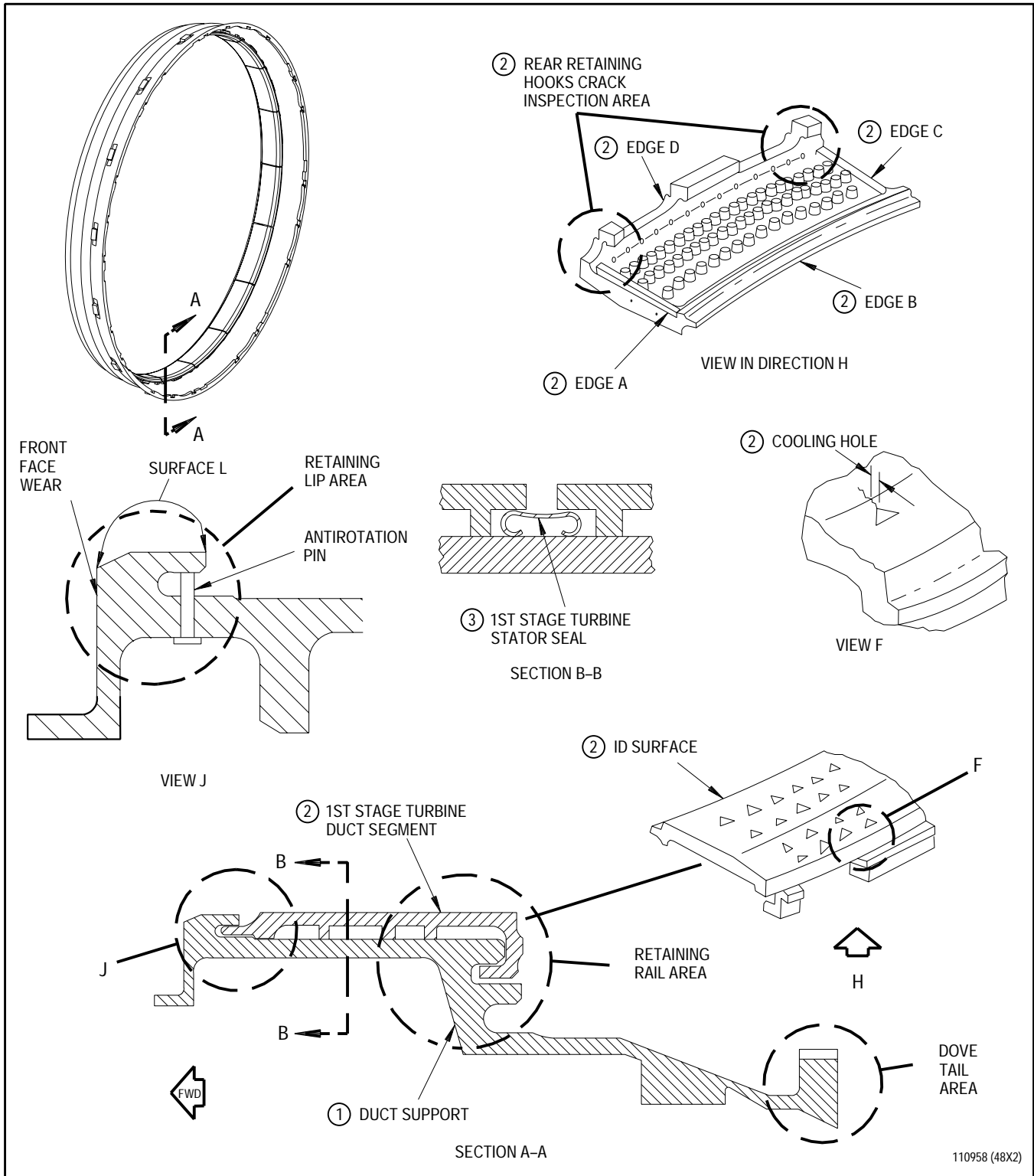


Figure 9. First Stage Turbine Duct and Support Set - Inspection (Sheet 1 of 2)

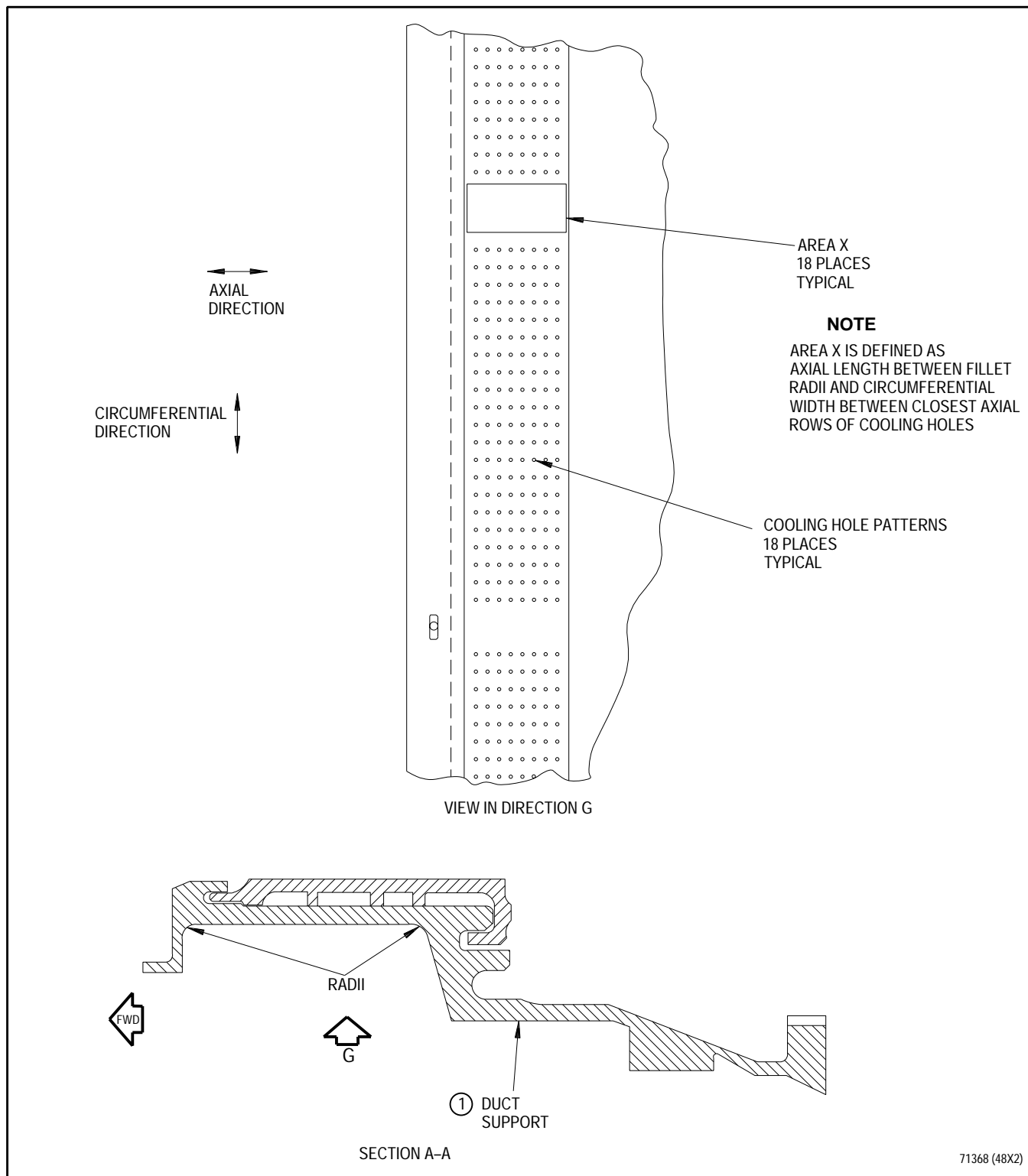


Figure 9. First Stage Turbine Duct and Support Set - Inspection (Sheet 2 of 2)

## Legend for figure 9

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
<b>NOTE</b>			
Replace old style duct and support sets. Refer to T.O. 2J-F100229(VI)-507.			
1. Duct support -			
Cracks, front retaining lip	Any amount of cracks on surface L. Cracks may extend onto forward face provided none extend outside ring defined by scallop bottoms.	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Dovetail and retaining rail cracks	Not serviceable	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Cracks originating from cooling holes	Not serviceable if crack length exceeds one hole diameter.	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Area X cracks (18 locations) (Supports incorporating TCTO 2J-F100229(VI)-507)	Not serviceable	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Cracks, all other areas	Not serviceable	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Wear, forward face	0.003 inch depth	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Wear, all over	0.010 inch depth	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Erosion, surface L	0.040 inch depth	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Erosion, other areas	Not serviceable	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.



## Legend for figure 9 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Duct support - (continued)			
Nicks and scratches	0.015 inch depth	See corrective action	Replace duct and support set. Refer to T.O. 2J-F100-53-8.
Antirotation pin wear	Up to 50% thickness. No more than two adjacent locations with maximum wear.	See corrective action	Replace pins per paragraph 3 and refer to T.O. 2J-F100-53-8.
Antirotation pin loose, missing	Not serviceable	See corrective action	Replace pins per paragraph 3 and refer to T.O. 2J-F100-53-8.
2. 1st stage turbine duct segment -			
Cracks originating from cooling holes	Any amount provided no two holes are connected	See corrective action	Replace segment. Refer to T.O. 2J-F100-53-8.
Cracks, rear retaining hooks	Not serviceable	See corrective action	Replace segment. Refer to T.O. 2J-F100-53-8.
Cooling holes blocked	Serviceable	-	-
Wear, all over	0.010 inch depth	See corrective action	Replace segment. Refer to T.O. 2J-F100-53-8.
ID surface -			
Cracks, axial	Not serviceable	See corrective action	Replace segment. Refer to T.O. 2J-F100-53-8.
Cracks, circumferential	Not serviceable	See corrective action	Replace segment. Refer to T.O. 2J-F100-53-8.
Pits, nicks, and dents	0.060 inch maximum diameter, up to 0.015 inch deep	See corrective action	Replace segment. Refer to T.O. 2J-F100-53-8.
Rub	0.025 inch depth	See corrective action	Replace segment. Refer to T.O. 2J-F100-53-8.

## Legend for figure 9 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. 1st stage turbine duct segment - (continued)			
Erosion	0.025 inch depth	See corrective action	Replace duct segment. Refer to T.O. 2J-F100-53-8.
Erosion, edges A, and C	0.015 inch depth circumferentially	See corrective action	Replace duct segment. Refer to T.O. 2J-F100-53-8.
Erosion, edges B, and D	0.015 inch depth radially	See corrective action	Replace duct segment. Refer to T.O. 2J-F100-53-8.
3. 1st stage turbine stator seal -			
Missing, bent, erosion, dented	Not serviceable	See corrective action	Replace segment seals. Refer to T.O. 2J-F100-53-8.

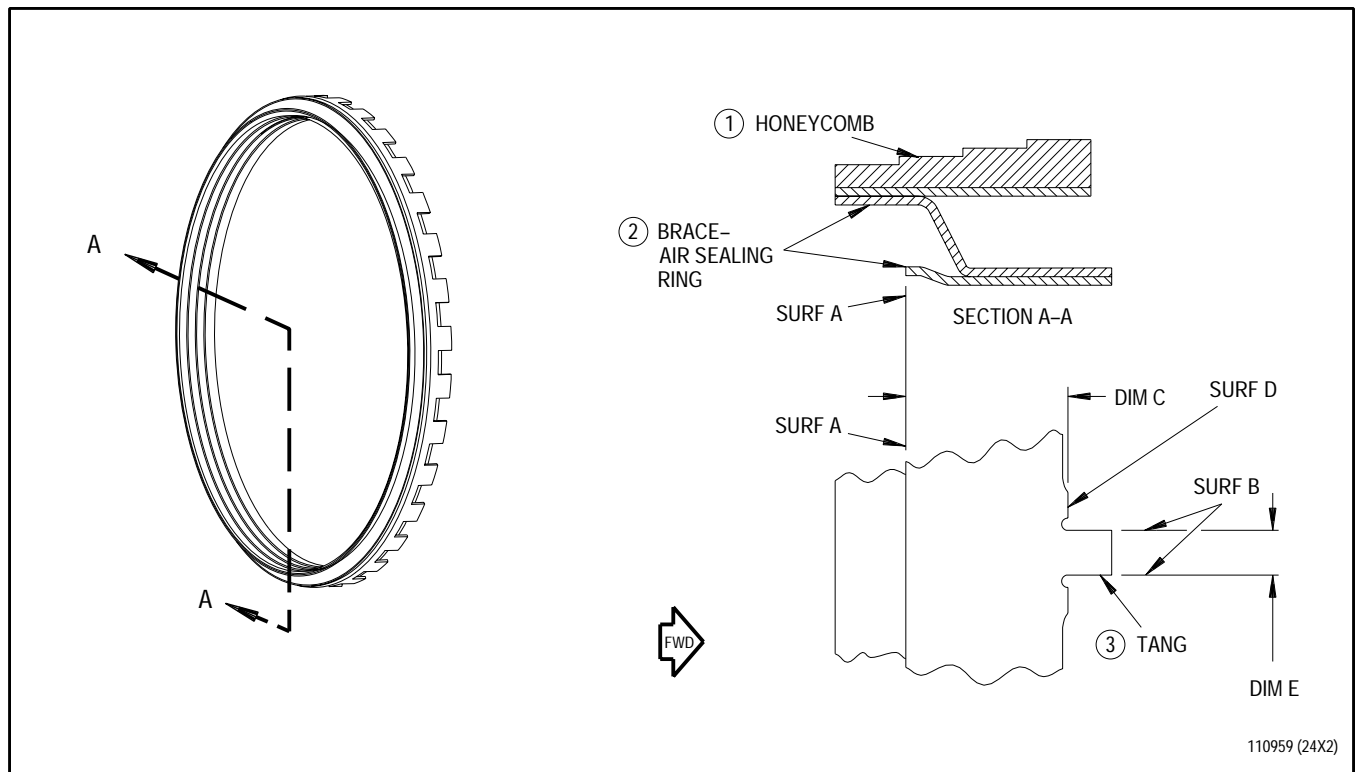


Figure 10. Second Stage Turbine Air Sealing Ring Assembly - Inspection

## Legend for figure 10

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
<b>NOTE</b>			
Ring assembly is not inspected unless rear compressor drive turbine is disassembled to replace other hardware. Part is not visible with rear compressor drive turbine as an assembly.			
1. Honeycomb -			
Damaged or missing cells	Up to 0.375 inch width and 0.750 inch circumferential length. No more than 2% (1.5 sq. in.) of total honeycomb area may be affected.	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.
Wear, grooving	0.040 inch depth for full circumference.	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.

## Legend for figure 10 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Brace, air sealing ring -			
Cracks	Not serviceable	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.
Wear - surface A	0.850 inch minimum - dimension C	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.
Wear - surface B	0.030 inch maximum - dimension E	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.
<b>NOTE</b>			
Especially look for aft end distortion and center section burn through.			
Distortion, burn through	Not serviceable	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.
3. Tang -			
Bent	0.025 inch	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.
Separation (gap) between sheet metal details	Visible gap between details permissible at surface D and end of tangs forward of seam weld. No cracking or separation of weld permitted.	See corrective action	Replace air sealing ring assembly. Refer to T.O. 2J-F100-53-8.

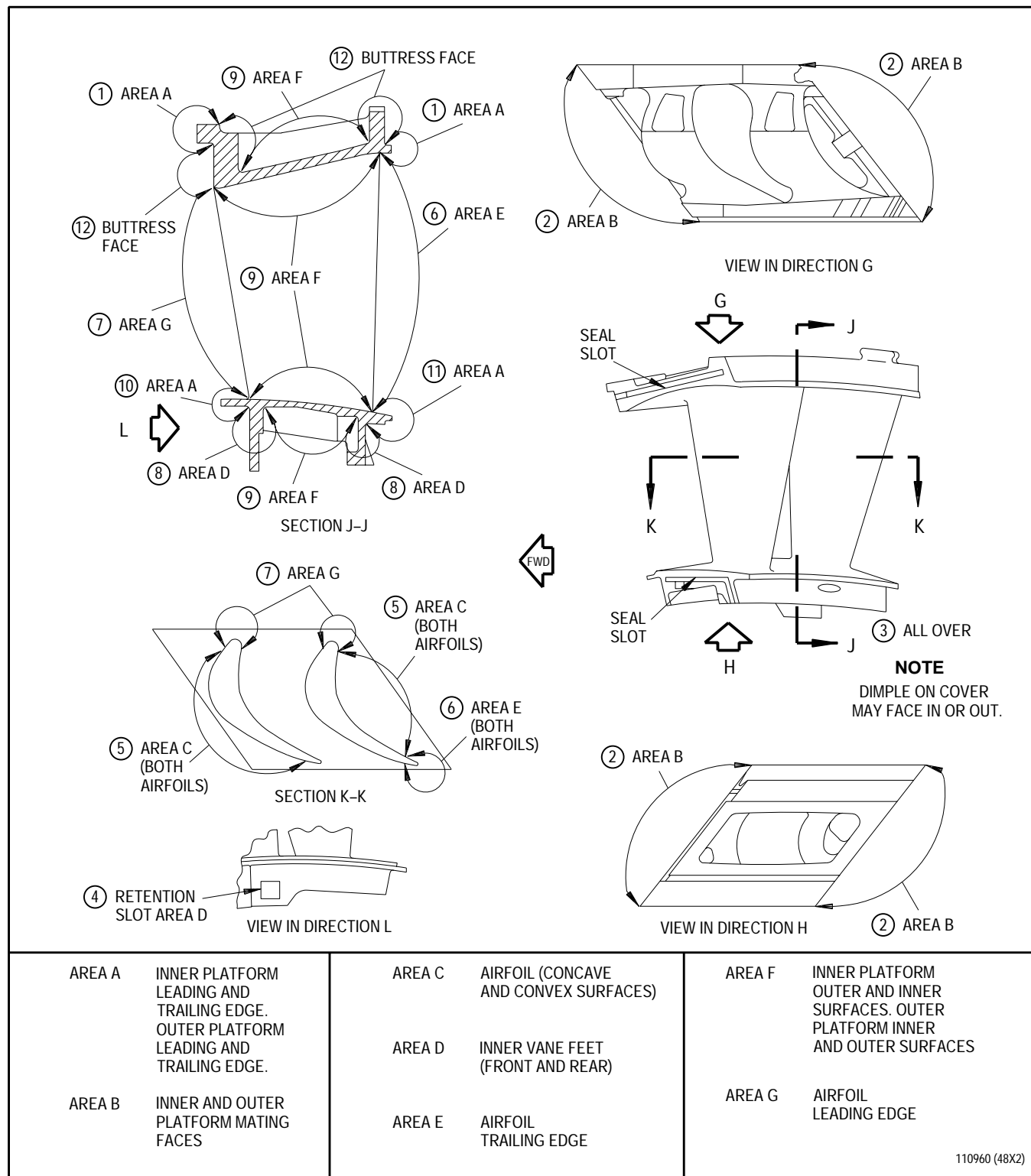


Figure 11. Second Stage Turbine Stator Vanes - Inspection

## Legend for figure 11

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
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## NOTE

Intersecting cracks in leading edge, trailing edge, platform, or airfoil which may result in loss of a vane section is cause for rejection.

1. Area A (outer platform leading and trailing edge) -

Axial cracks	Up to three locations provided cracks do not extend into buttress or outer lug flat faces. Up to 0.100 inch long and 0.031 inch wide, separated by 0.040 inch minimum.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
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2. Area B (inner and outer platform mating faces) -

Cracks	Any amount provided cracks do not extend beyond depth of seal slot. Three per edge extending to airfoil/ platform radius and up to 0.010 inch wide.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Burning, erosion	Any length along edge up to 0.015 depth. Rounded edges provided radius does not extend past seal slots or into airfoil radius.		

## Legend for figure 11 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. All over, entire vane -			
Missing, worn, chipped, or crazed coating	Serviceable	-	-
Flaking, peeling, or blistering	Not serviceable	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Nicks, dents	Any amount up to 0.015 inch maximum surface dimension and depth. Five locations per airfoil up to 0.100 inch maximum surface dimension and 0.060 inch depth. All indications must be clearly separated. No cracks from nick/ dent areas.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
4. Area D (retention slot) -			
Wear	0.010 inch depth - inside slot surface	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.



## Legend for figure 11 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
5. Area C (vane concave, convex surfaces) -			
Cracks	0.500 inch length and 0.010 inch width.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Nicks, dents	Up to 0.187 inch diameter and 0.010 inch deep	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Burning, erosion	0.010 inch depth	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
6. Area E (airfoil trailing edge) -			
Cracks and existing blends	Any amount less than 0.350 inch length, 0.020 inch width	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Nicks, dents	See Item 3. All over entire vane - limits.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Erosion	No base metal erosion allowed forward of trailing edge cooling slots.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
7. Area G (airfoil leading edge) -			
Cracks	0.250 inch length and 0.010 inch width.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Erosion, burning	0.015 inch deep along entire span	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Nicks, dents, or impact damage	See Item 3. All over entire vane - limits.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.

## Legend for figure 11 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Area D (vane inner feet front and rear) -			
Cracks	Not serviceable	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Wear	0.015 inch depth	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
9. Area F (Inner platform, inner and outer surfaces. Outer platform, inner and outer surfaces) -			
Cracks	0.500 inch length and 0.010 inch width	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Nicks, dents	Up to 0.250 inch diameter, 0.015 inch maximum depth	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Missing or blocked holes	Serviceable	See corrective action	Hand probe to remove blockage or replace vane. Refer to T.O. 2J-F100-53-8.
Missing thermal barrier coating	Serviceable	-	-
Erosion	0.020 inch depth. Erosion associated with cracks permissible to 0.010 inch width.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.

## Legend for figure 11 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
10. Area A (inner platform leading edge) -			
Nicks and dents	0.010 inch maximum depth	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Rub	Grooves up to 0.015 inch deep and 0.030 inch wide	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Cracks	Up to three locations provided cracks do not extend into inner lug flat faces.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
11. Area A (inner platform trailing edge) -			
Rub (2nd stage turbine blade)	May extend to within 0.080 inch of inner vane foot	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Cracks	Up to three locations provided cracks do not extend into inner lug flat faces.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.

## Legend for figure 11 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
12. Buttress faces -			
Cracks	0.100 inch length and 0.010 inch width.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Erosion	0.010 inch depth.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
Wear	0.005 inch depth	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.
13. Convex side platform to airfoil radius -			
Cracks	1.0 inch total span, 0.250 inch up airfoil and 0.010 inch width - each airfoil.	See corrective action	Replace vane. Refer to T.O. 2J-F100-53-8.

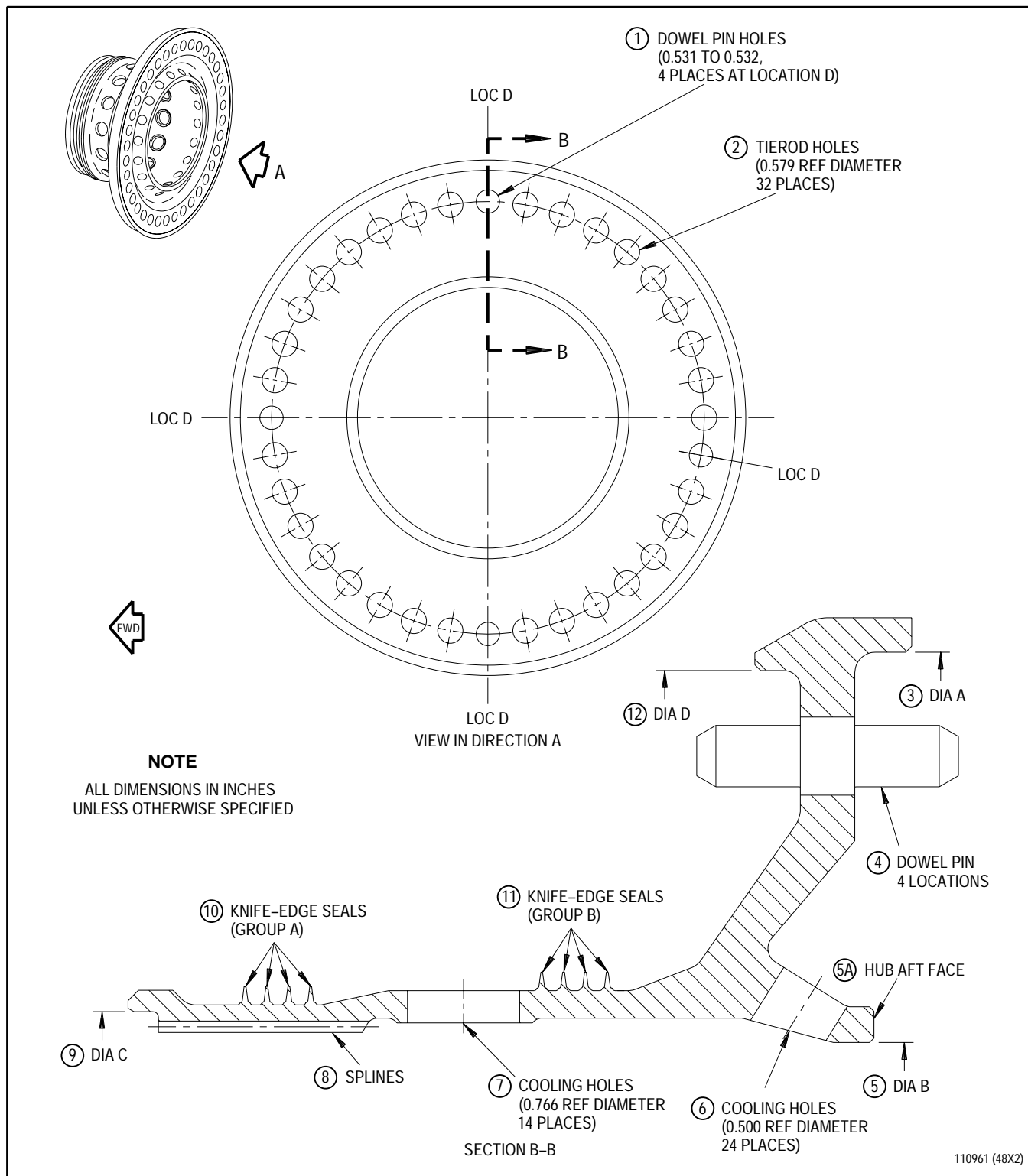


Figure 12. Turbine Hub Assembly - Inspection

## Legend for figure 12

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Dowel pin holes 0.5315 reference diameter -			
Cracks	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, scratches	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Wear	Not serviceable - not required unless dowel pins are loose or removed during repair.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
2. Tierod holes 0.579 inch reference diameter -			
Cracks	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, scratches	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
3. Diameter A (hub to 2nd disk) -			
Wear	11.237 inches maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
4. Dowel Pins -			
Damaged, loose	Not serviceable	See corrective action	Replace pins. Refer to T.O. 2J-F100-53-8.

## Legend for figure 12 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
5. Diameter B (hub to rear compressor shaft) -			
Wear	5.919 inch maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
5A. Hub, aft face			
Pits, nicks and foreign material deposits.	0.002 inch depth contact marks, with no raised material.	0.005 inch depth with three locations up to 0.010 inch depth	Blend repair with fine stone or replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
6. Cooling holes (0.500 inch reference diameter) -			
Cracks	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, scratches	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
7. Cooling holes 0.766 inch reference diameter -			
Cracks	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, scratches	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.

## Legend for figure 12 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
8. Splines -  Pits, nicks, and dents	Not serviceable	0.005 inch depth	Hand blend with fine stone to remove raised metal or replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
9. Diameter C (hub to rear compressor shaft) -  Wear	6.339 inch maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
10. Knife-edge seals (Group A - uncoated) -  Wear	0.010 inch diameter per knife-edge. Refer to T.O. 2J-F100-53-8, WP 801 00, reference 3057. Not required unless knife-edge shows visible wear.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.

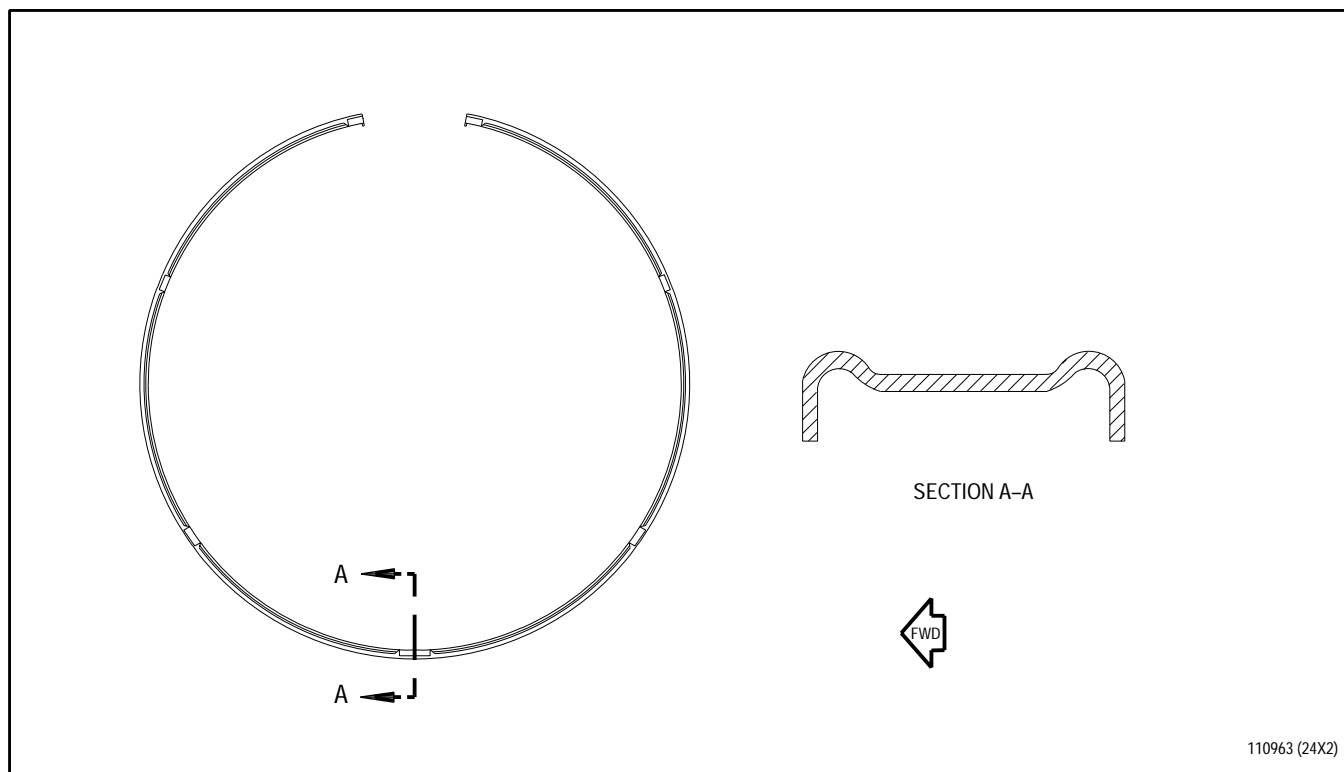


## Legend for figure 12 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
10. Knife-edge seals (Group A - uncoated) - (continued)			
Bent, rolled (without cracks)	0.500 inch length per knife-edge. Do not straighten.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Nicks and dents	0.005 inch depth with a smooth bottom.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
Cracks	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
11. Knife-edge seals (Group B - coated) -			
Cracks	Not serviceable	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Wear	0.010 inch diameter per knife-edge. Refer to T.O. 2J-F100-53-8, WP 801 00, reference 3256. Not required if knife-edge has any tip coating present.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8.
Nicks and dents	0.005 inch depth	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.

## Legend for figure 12 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
11. Knife-edge seals (Group B - coated) - (continued)			
Bent, rolled (without cracks)	0.500 inch in length per knife-edge. Do not straighten.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
Chipped or missing coating	Top coat may be missing up to 30% of surface area. Base coat may be chipped or missing in up to six 0.250 inch areas, but shall be separated by at least one inch per knife-edge. Any amount up to 0.050 inch long.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.
Foreign material deposits	Any amount serviceable.	-	-
12. Diameter D (hub to 1st disk) -			
Wear	10.985 inch maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace hub assembly. Refer to T.O. 2J-F100-53-8. Hold for future repair.


**Inspection Area -  
Condition**
**Maximum  
Serviceable Limits**
**Maximum  
Reparable Limits**
**Corrective Action**
**NOTE**

- Damper is only inspected when rear compressor turbine drive is disassembled to replace other hardware. Part is not visible as an assembly. Limits apply to both configurations.
- There are two configurations of dampers. Replace with part conforming with T.O. 2J-F100229(VI)-515.
- If damper is distorted or dislodged during disassembly, hold damper and 2nd stage blades for engineering revision.

All over -

Cracks	Not serviceable	See corrective action	Replace damper. Refer to T.O. 2J-F100-53-8.
Out-of-flat	0.050 inch	See corrective action	Replace damper. Refer to T.O. 2J-F100-53-8.
Nicks, dents, and scratches	Not serviceable	See corrective action	Blend repair damper. Refer to T.O. 2J-F100-53-8, WP 417 00.

**Figure 13. Turbine Blade Retaining Plate Damper - Inspection**

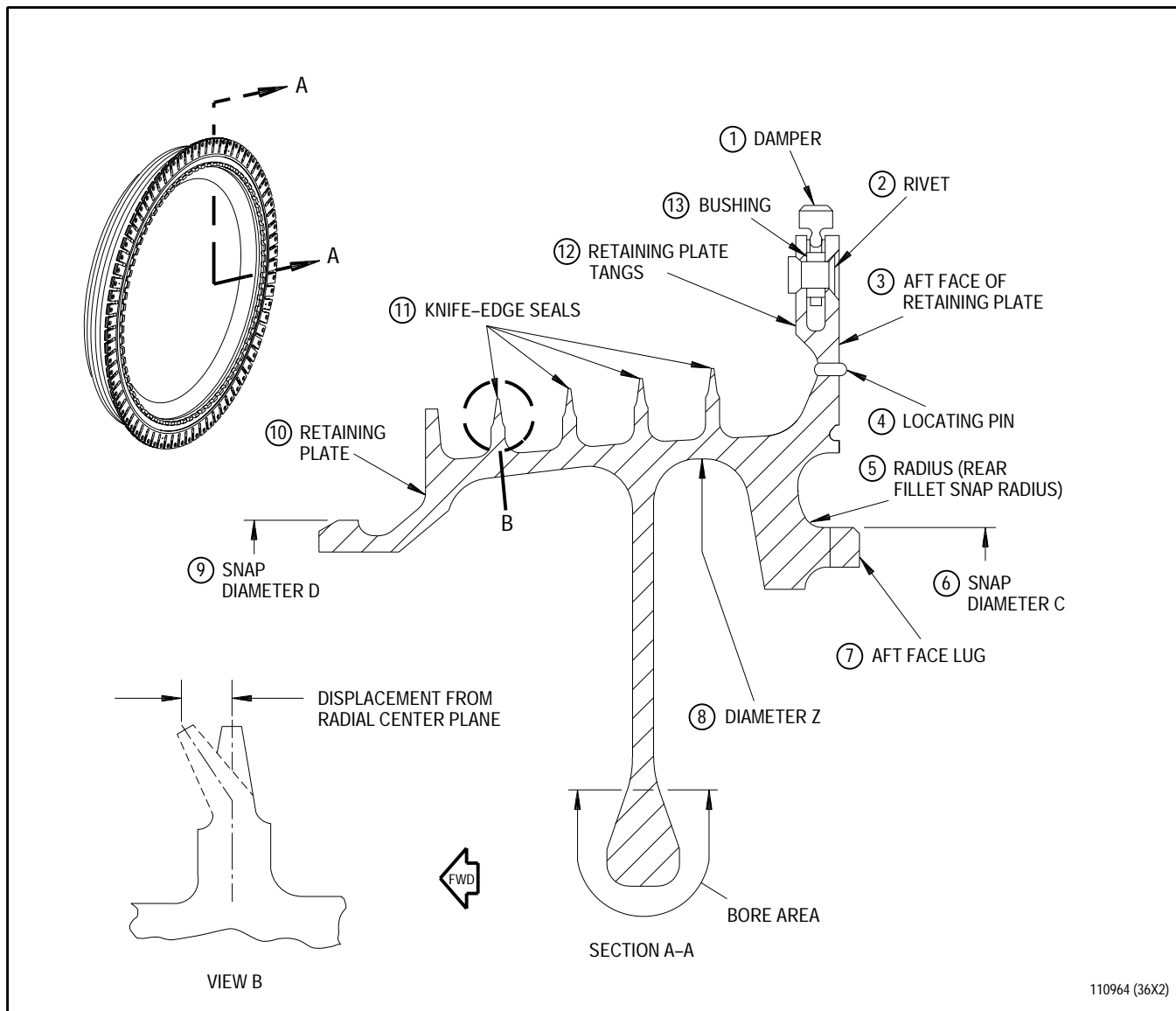


Figure 14. Second Stage Turbine Blade Retaining Plate Assembly - Inspection (Sheet 1 of 2)

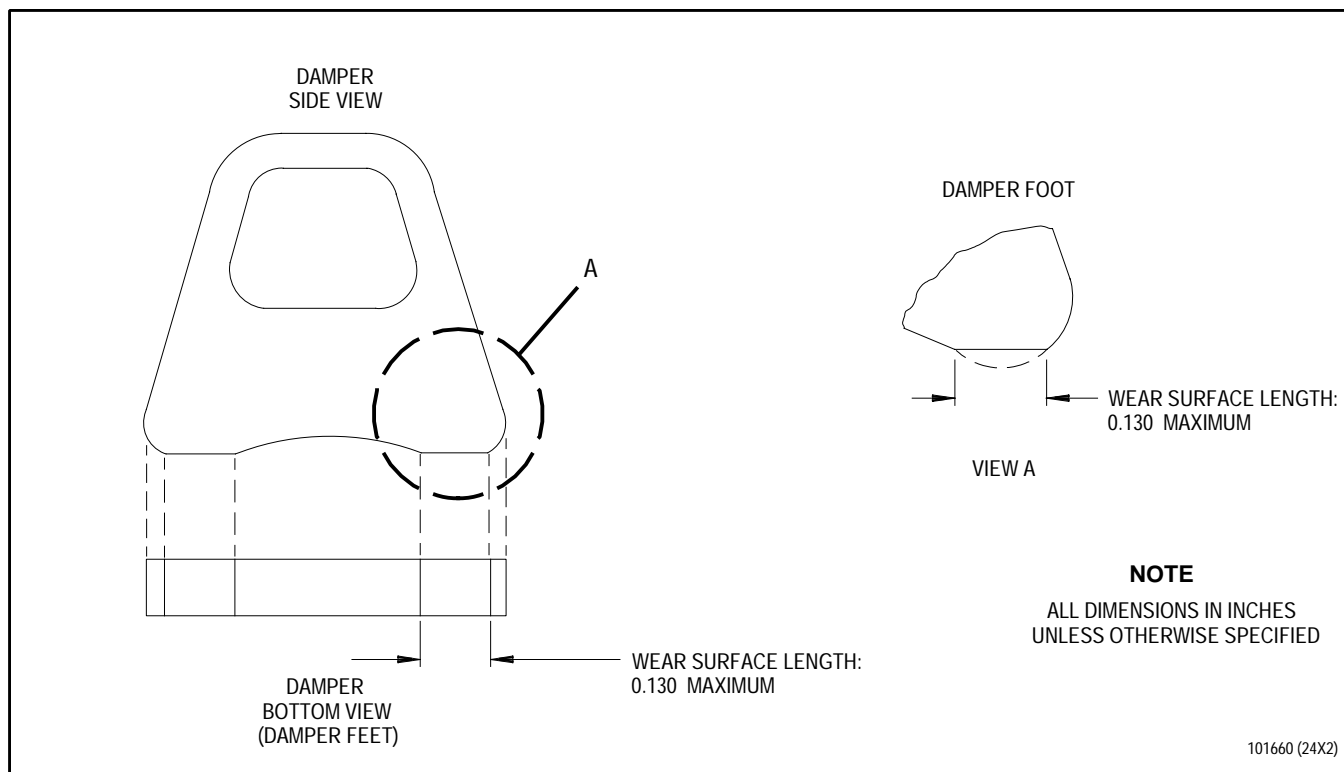


Figure 14. Second Stage Turbine Blade Retaining Plate Assembly - Inspection (Sheet 2 of 2)

## Legend for figure 14

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Damper -			
Missing, cracked	Not serviceable	See corrective action	Replace damper and 2nd stage blades. Refer to T.O. 2J-F100-53-8.
Wear	Up to 0.130 inch length across each flat in circumferential direction.	See corrective action	Replace damper. Refer to T.O. 2J-F100-53-8.
Movement	Damper shall move freely	See corrective action	Replace damper. Refer to T.O. 2J-F100-53-8.
2. Rivet -			
Cracked, missing	Not serviceable	See corrective action	Replace rivet. Refer to T.O. 2J-F100-53-8.
3. Aft face of retaining plate -			
Wear	Serviceable	-	-
4. Locating pin -			
Broken or bent	Not serviceable	See corrective action	Replace pins per paragraph 12. Refer to T.O. 2J-F100-53-8.

## NOTE

Some PW-229 spacers may have four pin holes on aft face, but only two pins are used.

Missing	Two pins ( offset approximately 135 degrees apart) must be present.	See corrective action	Replace pins per paragraph 12. Refer to T.O. 2J-F100-53-8.
5. Rear fillet snap radius -			
Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.

## Legend for figure 14 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
6. Snap diameter C - Wear	15.957 inch minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
7. Aft face lug - Nicks, dents	Not serviceable	See corrective action	Blend smooth any sharp edges. Refer to T.O. 2J-F100-53-8.
8. Diameter Z - Stretch	Not required until scheduled depot visit.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
9. Snap diameter D - Wear	16.031 inch minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
10. Retaining plate - Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Nicks, dents, scratches	Not serviceable	0.005 inch depth	Blend repair per paragraph 12 or replace retaining plate. Refer to T.O. 2J-F100-53-8.

## Legend for figure 14 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
11. Knife-edge seals -			
Wear	0.010 inch per diameter. Refer to T.O. 2J-F100-53-8, WP 801 00, reference 3287. Not required if knife-edge has any tip coating present.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Bent, rolled (without cracks)	0.500 inch length per knife-edge. Do not straighten.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8. Hold for future repair.
Nicks, dents	0.005 inch depth	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8. Hold for future repair - requires knife-edge strip, blend, and recoat
Chipped or missing coating	Top coat may be missing up to 30% of surface area. Base coat may be chipped or missing in up to six 0.250 inch areas, but shall be separated by at least one inch per knife-edge. Any amount up to 0.050 inch long.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8. Hold for future repair.
Foreign material deposits	Any amount serviceable.	-	-



## Legend for figure 14 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
12. Retaining plate tangs -			
Bent	Two locations up to 0.020 inch forward out of plane, measured at outer edge. Ensure damper on each tang moves freely.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
13. Bushing -			
Missing, or if found damaged when repairing or replacing other parts	Not serviceable	See corrective action	Replace bushing. Refer to T.O. 2J-F100-53-8.

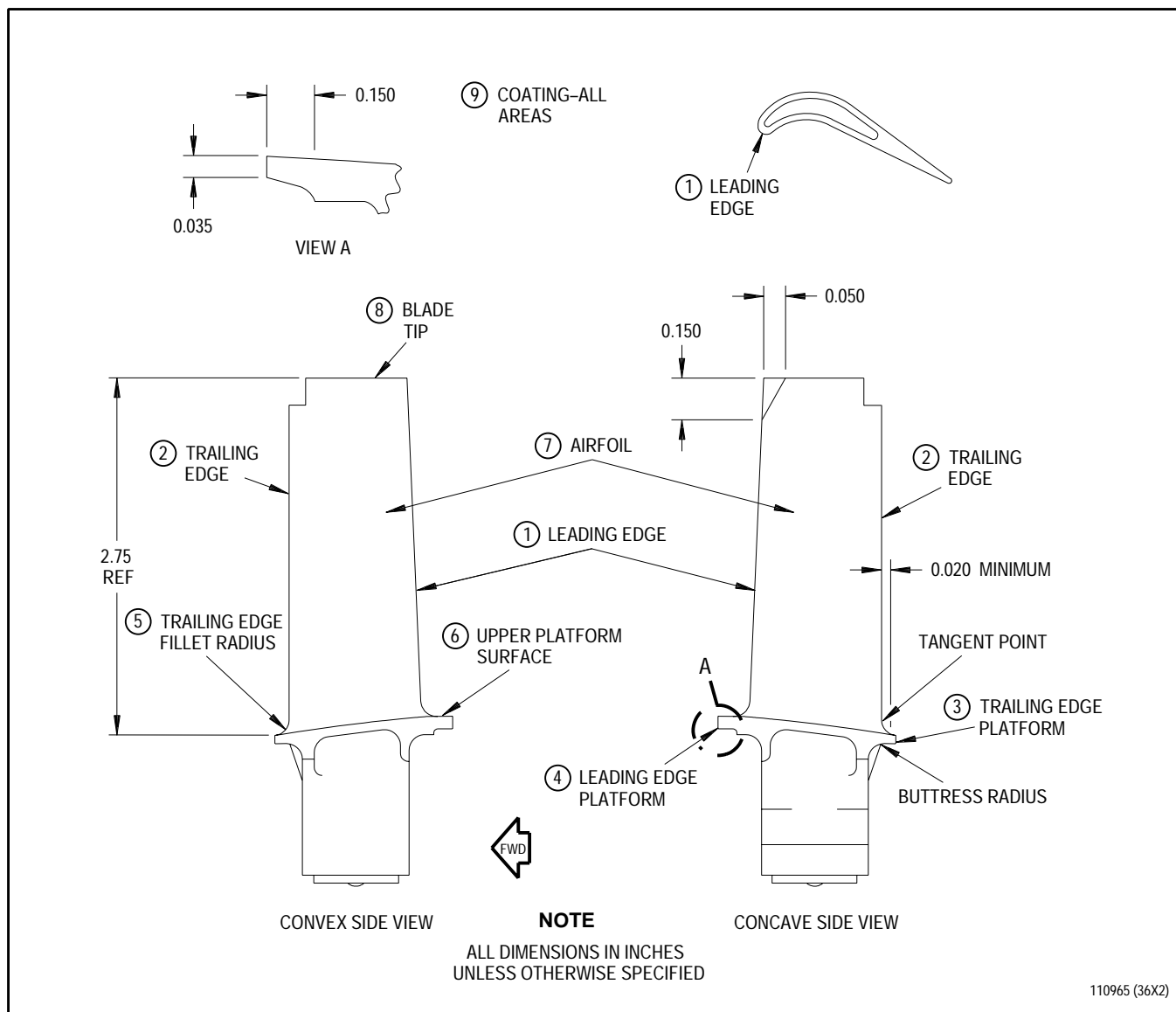


Figure 15. Second Stage Turbine Rotor Blade - Inspection

## Legend for figure 15

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
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## NOTE

Measure installed 2nd stage blade tip diameter before rear compressor drive turbine disassembly.

## 1. Leading edge -

Dents, nicks, impact damage	None allowed within 0.500 inch of platform. Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and 0.010 depth. Two round bottomed imperfections 0.030 inch maximum surface dimension and up to 0.010 inch depth. All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Erosion	0.015 inch depth	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Rub at tip	None allowed within 0.500 inch of platform. 0.150 inch length and 0.050 inch depth. No cracks allowed.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

## Legend for figure 15 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
2. Trailing edge -			
Dents, nicks, other impact damage	None allowed within 0.500 inch of platform. Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and 0.010 depth. Three round bottomed imperfections 0.030 inch maximum surface dimension and up to 0.010 inch depth. All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Rub	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

## Legend for figure 15 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Trailing edge platform -  Rub	0.040 inch minimum platform thickness. 0.020 inch minimum trailing edge dimension. No rub permitted in buttress radius. No rub permitted on airfoil side of platform. No missing pieces. No cracks allowed.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
4. Leading edge platform -  Rub	0.035 inch minimum thickness measured at 0.150 inch aft of existing platform leading edge. No cracks allowed.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

## Legend for figure 15 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
5. Trailing edge fillet radius -			
Nicks, dents	One round bottomed location up to 0.030 inch diameter and 0.005 inch depth.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
6. Upper platform surface -			
Nicks, dents	Any amount up to 0.015 inch maximum surface dimension and depth. Five imperfections up to 0.030 inch diameter and 0.005 inch depth. All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
7. Airfoil -			
Nicks, dents	None allowed within 0.500 inch of platform. Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and depth. Two imperfections per side, 0.030 inch surface dimension, 0.010 inch depth, and no closer than 0.750 inch from tip. Two locations per side on remainder of airfoil, 0.062 inch surface dimension, 0.020 inch depth within 0.750 inch of tip. All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

## Legend for figure 15 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
7. Airfoil - (continued)			
<b>NOTE</b>			
Blade necking or rippling occurs slightly below airfoil midspan (approximately 0.750 inch above platform) and is characterized by airfoil stretch and reduced cross-sectional area.			
Necking or rippling	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Dimpling	Serviceable	-	-
Erosion, minor burning	0.005 inch depth None allowed within 0.500 inch of platform.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Foreign material splatter	0.010 inch height.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8. Clean per WP 201 00.
Cracks in all area (including radii)	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Blade stretch	0.010 inch maximum - not required until scheduled depot visit.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
No pocket visible	Not serviceable	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.

## Legend for figure 15 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
8. Blade tip -			
Nicks, dents	Any amount of round bottomed dents up to 0.015 inch maximum surface dimension and depth. Three round bottomed locations up to 0.062 inch radial length and 0.030 inch depth. All indications must be clearly separated.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Cracks	Two radial cracks up to 0.100 inch length each, separated by 0.250 inch minimum.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Erosion	Serviceable within rub dimension limit.	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Wear, rub	Tip pocket must be present. Installed tip diameter must be 24.670 inches minimum at center of blade tips - may be checked with Pi tape and without shims.	See corrective action	Replace blades. Refer to T.O. 2J-F100-53-8. Hold for future repair if tip pocket is present.



## Legend for figure 15 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
9. Coating - all areas (airfoil and outer platform surface) -			
Flaking, peeling, or blistering	Not serviceable	See corrective action	Perform over temperature inspection. Refer to T.O. 2J-F100-53-8.
Chipped coating	Serviceable	-	-
Coating crazing	Serviceable except none allowed within 0.500 inch of platform	See corrective action	Replace blade. Refer to T.O. 2J-F100-53-8.
Pits, porosity, voids	Serviceable	-	-

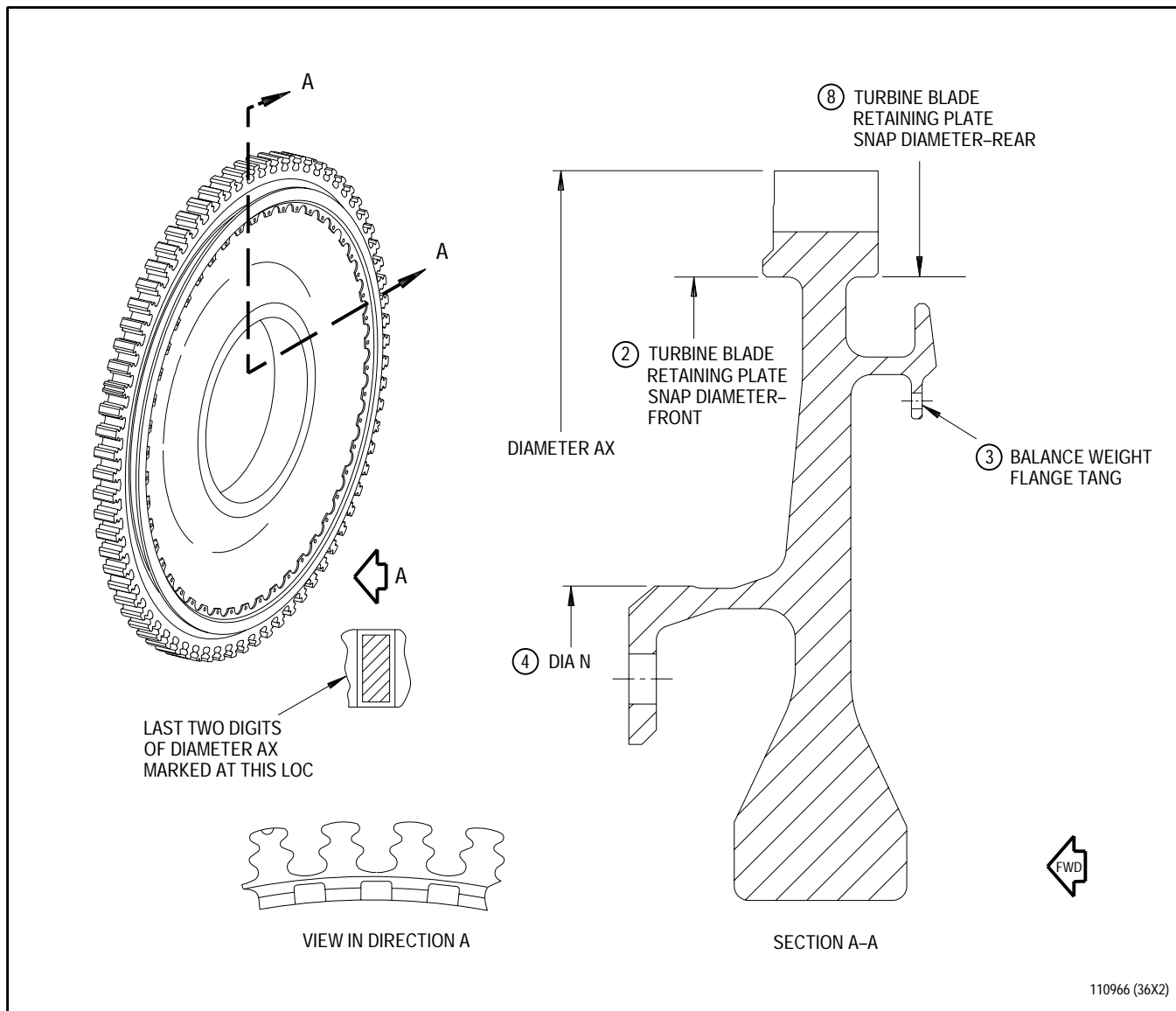


Figure 16. Second Stage Turbine Disk - Inspection (Sheet 1 of 3)

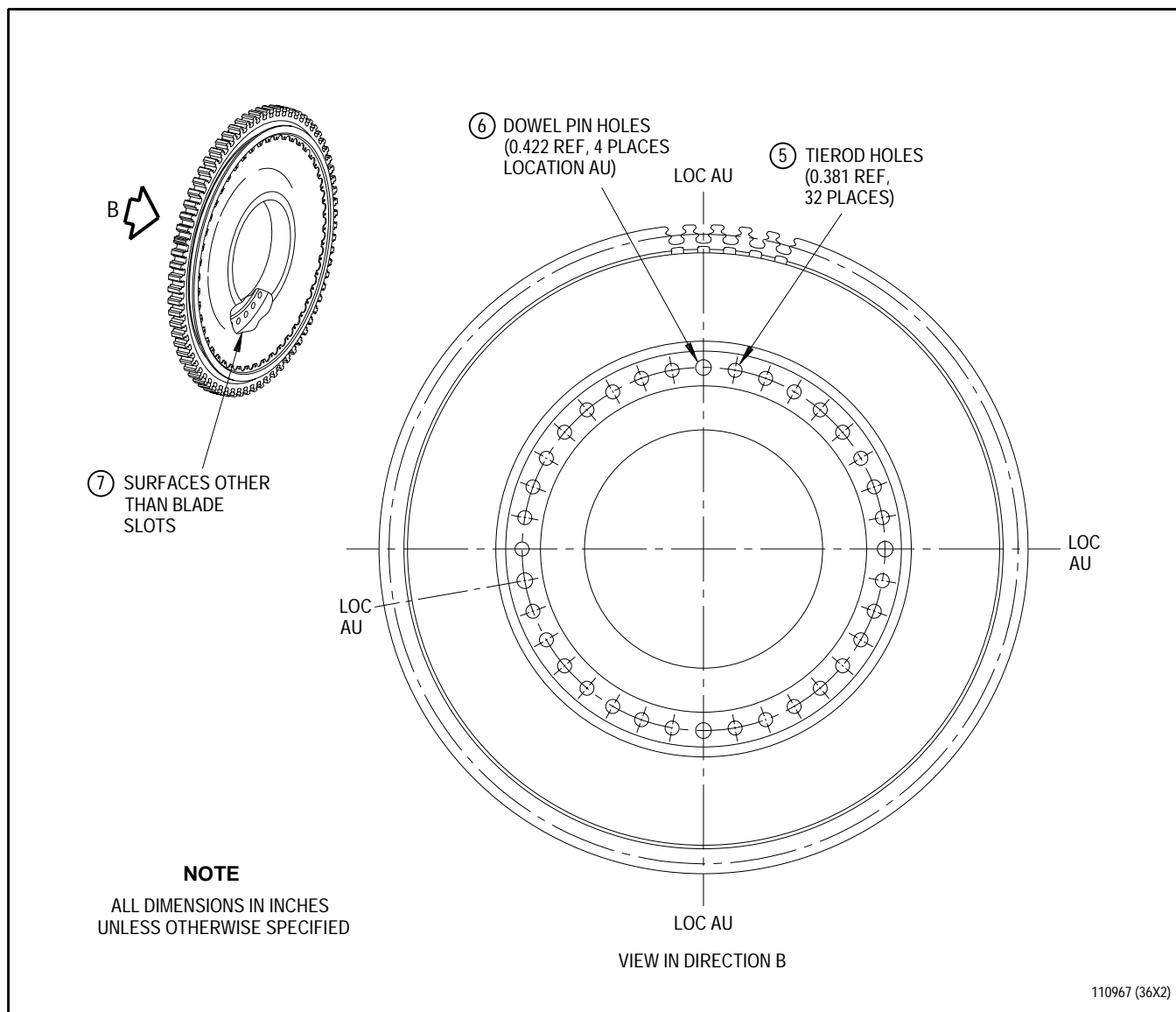


Figure 16. Second Stage Turbine Disk - Inspection (Sheet 2 of 3)

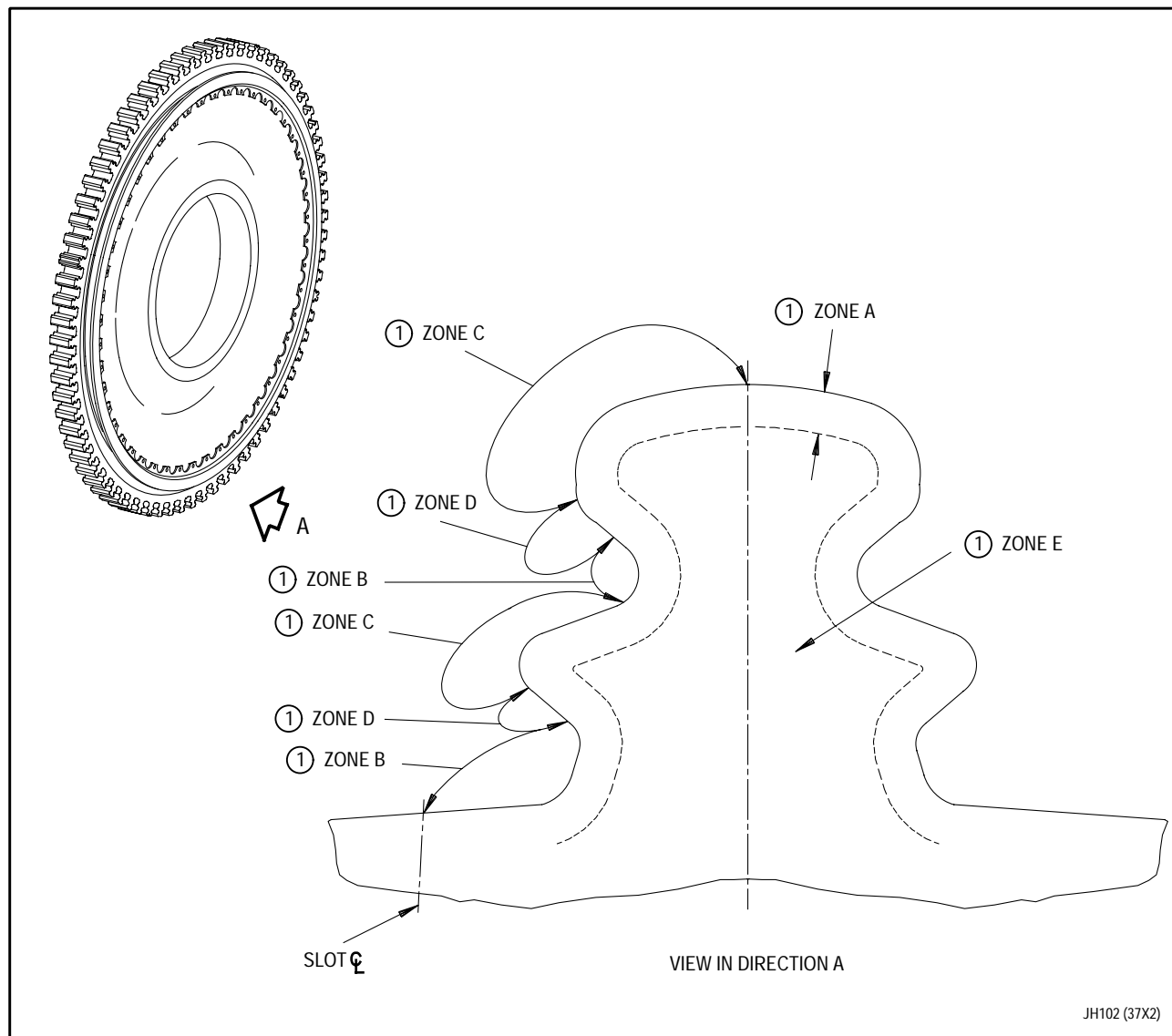


Figure 16. Second Stage Turbine Disk - Inspection (Sheet 3 of 3)

## Legend for figure 16

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Blade slot - Zone A through zone E - (typical both sides)			
Pits, nicks, dents, scratches	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
Cracks	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
2. Turbine blade retaining plate snap diameter - front			
Wear	15.965 inch maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
3. Balance weight flange tang -			

## NOTE

Balance tang removal allowed up to six locations maximum - no adjacent locations.

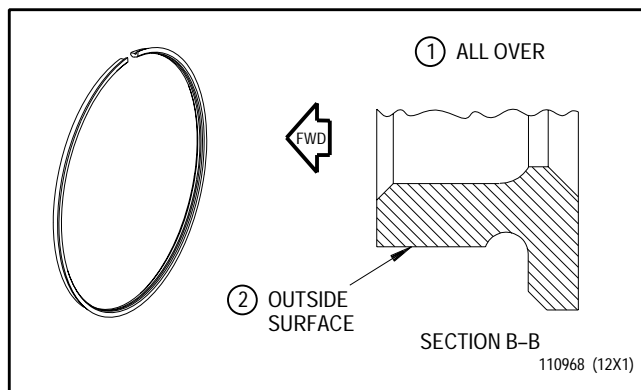
Cracked, broken, or sheared	Not serviceable	See corrective action	Blend repair per paragraph 5 or replace disk. Refer to T.O. 2J-F100-53-8.
Bent	0.020 inch (forward or aft) out of plane, measured at ID. Do not reattach any weight.	See corrective action	Blend repair disk per paragraph 5 or replace disk. Refer to T.O. 2J-F100-53-8.
Burning or erosion	Not serviceable	See corrective action	Perform borefire inspection per WP 027 00 and refer to T.O. 2J-F100-53-8.

## Legend for figure 16 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Balance weight flange tang - (continued)			
Balance weights - improperly flared rivet	Not serviceable	See corrective action	Replace rivet per paragraph 9.
Balance weights - missing	Not serviceable	See corrective action	If no other damage is noted, rebalance module. Refer to T.O. 2J-F100-53-8.
4. Diameter N -			
Wear	11.237 inch minimum. Not required unless snap diameter shows visible wear. Contact marks from assembly/ disassembly are serviceable.	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
5. Tierod holes 0.381 inch reference diameter -			
Cracks	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, scratches	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.
6. Dowel pin holes 0.422 inch reference diameter -			
Cracks	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Pits, nicks, dents, scratches	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.

## Legend for figure 16 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
7. Surfaces other than blade slots -			
Pits, nicks, dents, scratches	0.005 inch depth, smooth bottom and no sharp edges.	0.010 inch depth	Blend repair per paragraph 6 or replace disk. Refer to T.O. 2J-F100-53-8.
Cracks	Not serviceable	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8.
Corrosion	Not serviceable	0.002 inch depth over 2 square inches.	Hand polish using rubberized abrasive stone or abrasive paper 600 grit or finer or replace disk. Refer to T.O. 2J-F100-53-8.
8. Turbine blade retaining plate snap diameter, rear			
Wear	15.962 inches maximum. Not required unless snap diameter shows visible wear. Contact marks from assembly/disassembly are serviceable.	See corrective action	Replace disk. Refer to T.O. 2J-F100-53-8. Hold for future repair.



Inspection Area - Condition		Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1.	All over -			
	Cracks	Not serviceable	See corrective action	Replace ring. Refer to T.O. 2J-F100-53-8.
	Out-of-flat	0.050 inch	See corrective action	Replace ring. Refer to T.O. 2J-F100-53-8.
	Nicks, dents and scratches	0.010 inch depth	One location up to 0.020 inch depth	Hand blend using fine stone to remove high metal.
2.	Outside surface -			
	Raised metal	Not serviceable	Any amount	Hand blend using fine stone to remove high metal.
	Galling	Not serviceable	0.001 inch depth	Polish area to original finish of surrounding area.

Figure 17. Turbine Blade Retaining Plate Ring - Inspection



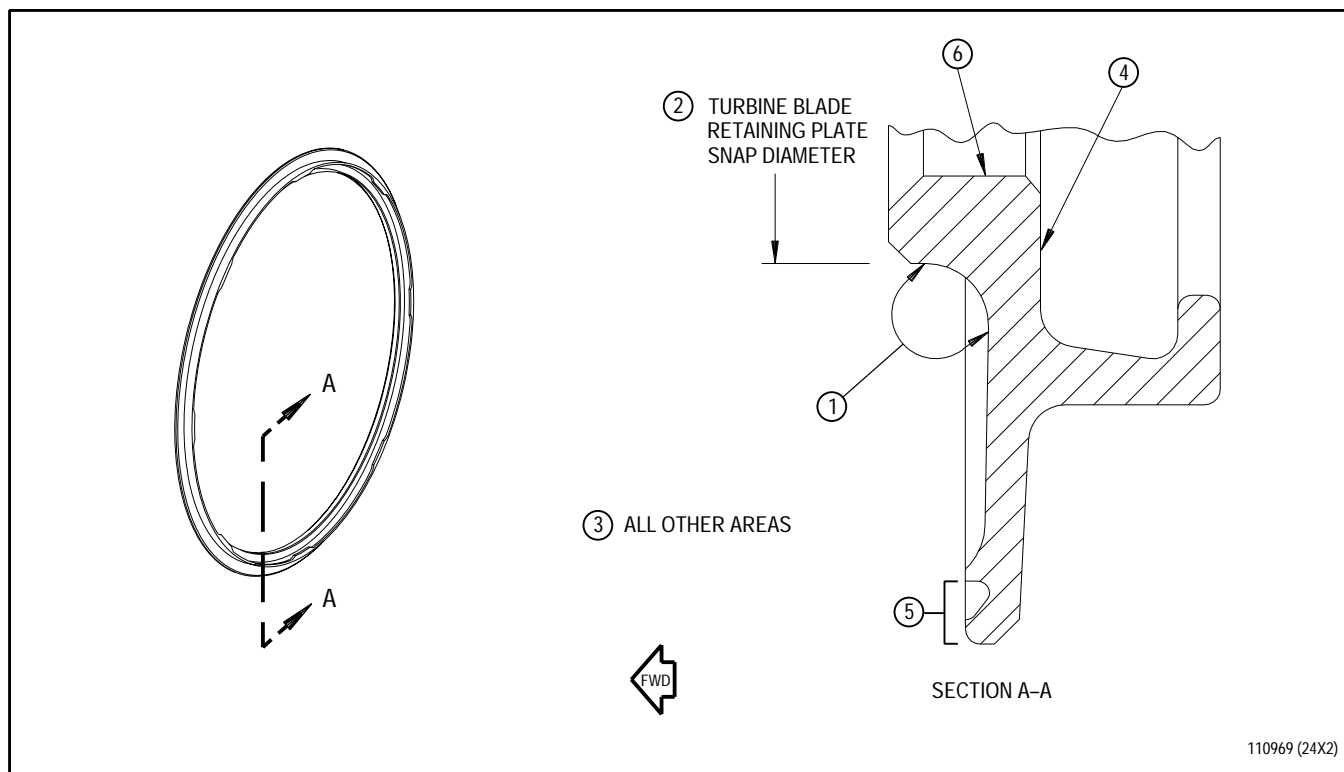


Figure 18. Second Stage Turbine Blade Rear Retaining Plate - Inspection

## Legend for figure 18

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Hook pad area - Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Burned	Not serviceable	See corrective action	Perform borefire inspection per WP 027 00 and refer to T.O. 2J-F100-53-8.
2. Turbine blade retaining plate snap diameter Wear	15.967 inch minimum. Not required unless snap diameter shows visible wear. Contact Marks from assembly/disassembly are serviceable.	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
3. All other areas - Cracks	Not serviceable	See corrective action	Replace retaining plate. Refer to T.O. 2J-F100-53-8.
Nicks, dents, scratches	0.005 inch depth	0.010 inch depth	Polish area to original finish of surrounding area.
4. Rear face - Contact indications	Serviceable provided no step is present.	0.001 inch depth	Polish area to remove step. Polish to original finish of surrounding area.
5. Front face - Galling	Not serviceable	0.002 inch depth	Polish area to original finish of surrounding area.
6. Inside surface - Galling	Not serviceable	0.001 inch depth	Polish area to original finish of surrounding area.
Raised metal	Not serviceable	Any amount	Hand blend using fine stone to remove raised metal.

### 3. FIRST STAGE TURBINE DUCT AND SUPPORT SET - ANTIROTATION PIN REPLACEMENT.

(See figure 9.)

- a. Remove duct and support set by disassembling rear compressor drive turbine. Refer to T.O. 2J-F100-53-8, WP 011 00.
- b. Disassemble duct and support set. Refer to T.O. 2J-F100-53-8, WP 406 00.
- c. Remove segment antirotation pins using a drift.
- d. Chill replacement antirotation pins.
- e. Install replacement antirotation pins using a drift.
- f. Assemble duct and support set with new 1st stage turbine stator seals. Refer to T.O. 2J-F100-53-8, WP 406 00.
- g. Install duct and support set while assembling rear compressor drive turbine. Refer to T.O. 2J-F100-53-8, WP 701 00.

### 4. FIRST STAGE TURBINE AIR SEAL - SCALLOPED FLANGE TANG REMOVAL.

(See figures 2 and 7.)

- a. Remove air seal from 1st stage turbine disk. Refer to T.O. 2J-F100-53-8, WP 011 00. Discard all pin rivets and collars.
- b. Ensure knife-edge seals are not bent out of plane or removed per figure 2.
- c. Remove up to four balance weight flange tangs, no two adjacent per figure 7. See paragraph 5 for removal.
- d. Install air seal onto 1st stage turbine disk. Refer to T.O. 2J-F100-53-8, WP 701 00.

- e. Balance rear compressor drive turbine module. Refer to T.O. 2J-F100-53-8, WP 702 00.

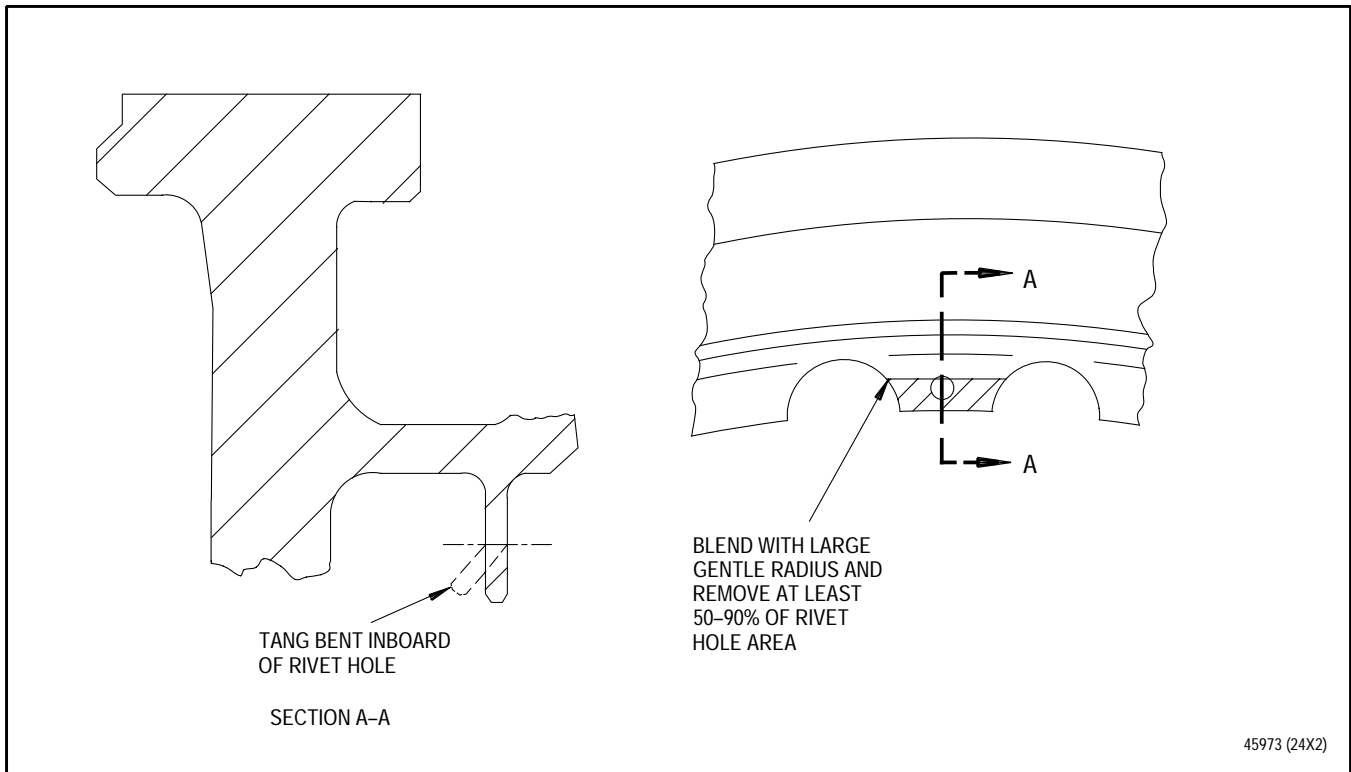
### 5. SECOND STAGE TURBINE DISK BALANCE WEIGHT FLANGE TANG - REMOVAL.

(See figures 19 and 20.)

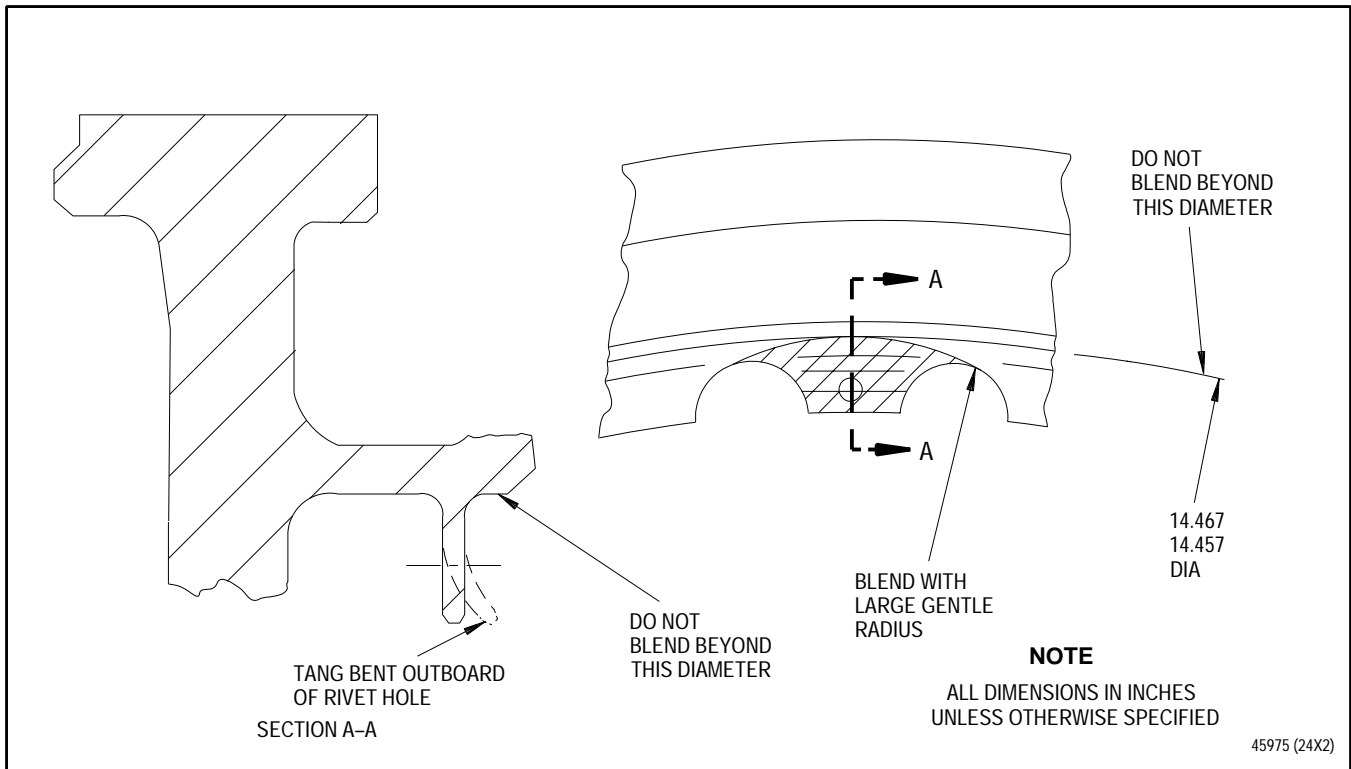


Do not attempt to straighten bent tangs as excessive damage to turbine disk may result causing rejection.

- a. Ensure no more than six tangs and no more than two adjacent tangs are removed. Replace disk, if necessary.
- b. Blend to ensure surface finish of all blends is 63AA finish or smoother.
- c. Remove tangs that are cracked or bent outboard of rivet hole by blending. Blend so material is at least even with rivet hole center per figure 19.
- d. Remove sheared, cracked, or excessively bent tangs by blending up to, but not beyond 14.457 to 14.467 inch diameter. It is preferred to stay below this diameter by 0.005 inch per figure 20. Blend to a smooth continuous radius.
- e. Fluorescent penetrant inspect after blending. Refer to T.O. 2J-F100-9. Reject part if any crack indications are found.
- f. Dynamic balance rotor and stator assembly. Refer to T.O. 2J-F100-53-8, WP 702 00.



**Figure 19. SECOND STAGE TURBINE DISK - BALANCE WEIGHT FLANGE TANG REMOVAL FOR TANG BENT INBOARD OF RIVET HOLE.**



**Figure 20. SECOND STAGE TURBINE DISK - BALANCE WEIGHT FLANGE TANG REMOVAL FOR TANG BENT OUTBOARD OF RIVET HOLE**

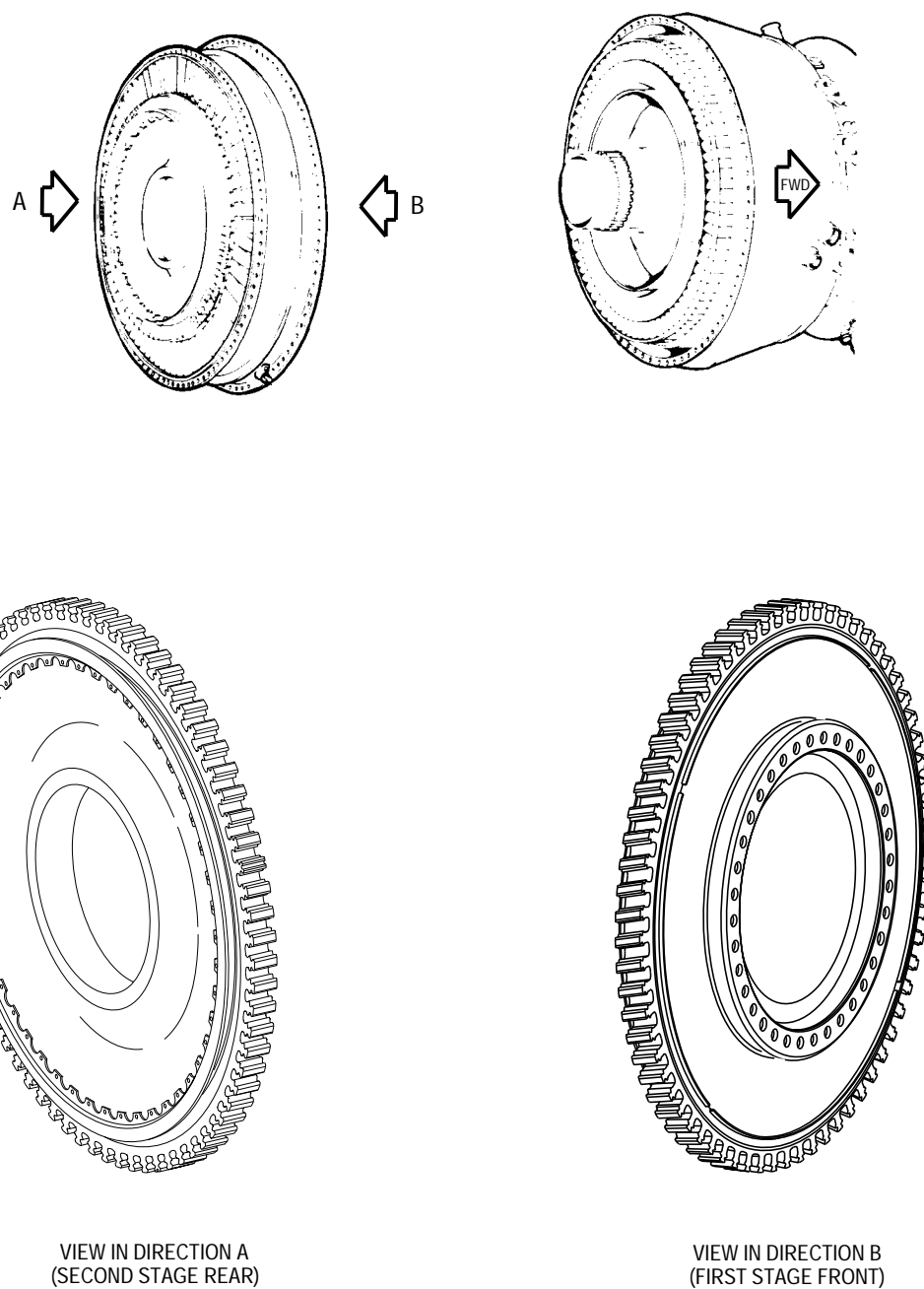
## 6. FIRST AND SECOND STAGE TURBINE DISK - REPAIR.

(See figure 21.)

### NOTE

Procedure is for repair of pits, nicks, dents, and scratches.

- a. Hand blend turbine disk surfaces using blending stones and crocus cloth. Refer to T.O. 2J-F100-53-1, WP 091 00.
- b. All blending shall extend to a distance of at least 15 times the depth of damage.
- c. Blend to ensure surface finish of all blends is 63AA finish or smoother.
- d. Fluorescent penetrant inspect after blending. Refer to T.O. 2J-F100-9. Reject part if any crack indications are found.
- e. If no cracks are found, degrease area using contact cleaner solvent.



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Figure 21. First and Second Stage Turbine Disk - Repair

## 7. FIRST STAGE TURBINE DISK COMBINATION PIN RIVET/BALANCE WEIGHT TANG - BLEND REPAIR.

(See figure 7.)



- Do not attempt to straighten bents tangs as excessive damage to turbine disk may result causing rejection.
- No cracks or blending is allowed within 0.250 inch zone either side of pin rivet hole (center of three holes on tang) and is cause for rejection of part.
  - a. Replace turbine disk if cracks or blending are present within 0.250 inch zone either side of pin rivet hole (center of three holes on tang). Refer to T.O. 2J-F100-53-8.
  - b. Do not blend more than one corner on any particular combination tang or more than four total balance tang locations (combination and single tangs).
  - c. Blend to ensure surface finish of all blends is 63AA finish or smoother.
  - d. Blend to at least center of tang hole to prevent future balance weight installation.
  - e. Fluorescent penetrant inspect after blending. Refer to T.O. 2J-F100-9. Reject part if any crack indications are found.
  - f. Dynamic balance rotor and stator assembly. Refer to T.O. 2J-F100-53-8, WP 702 00.

**8. FIRST STAGE TURBINE DISK BALANCE  
WEIGHT FLANGE TANG - REMOVAL**

(See figure 22.)



Do not attempt to straighten bent tangs as excessive damage to turbine disk may result causing rejection.

- a. Replace turbine disk if more than four total balance tang locations (combination and single tangs) require blending.
- b. Blend to ensure surface finish of all blends is 63AA finish or smoother.
- c. Remove tangs that are cracked or bent outboard of rivet hole by blending. Blend so material is at least even with rivet hole center. If required, remove tang per step d.
- d. Remove sheared, cracked, or excessively bent tangs by blending up to, but not beyond 13.765 to 13.785 inch diameter. It is preferred to stay below this diameter by 0.005 inch per figure 22. Blend to a smooth continuous radius.
- e. Fluorescent penetrant inspect after blending. Refer to T.O. 2J-F100-9. Reject part if any crack indications are found.
- f. Dynamic balance rotor and stator assembly. Refer to T.O. 2J-F100-53-8, WP 702 00.



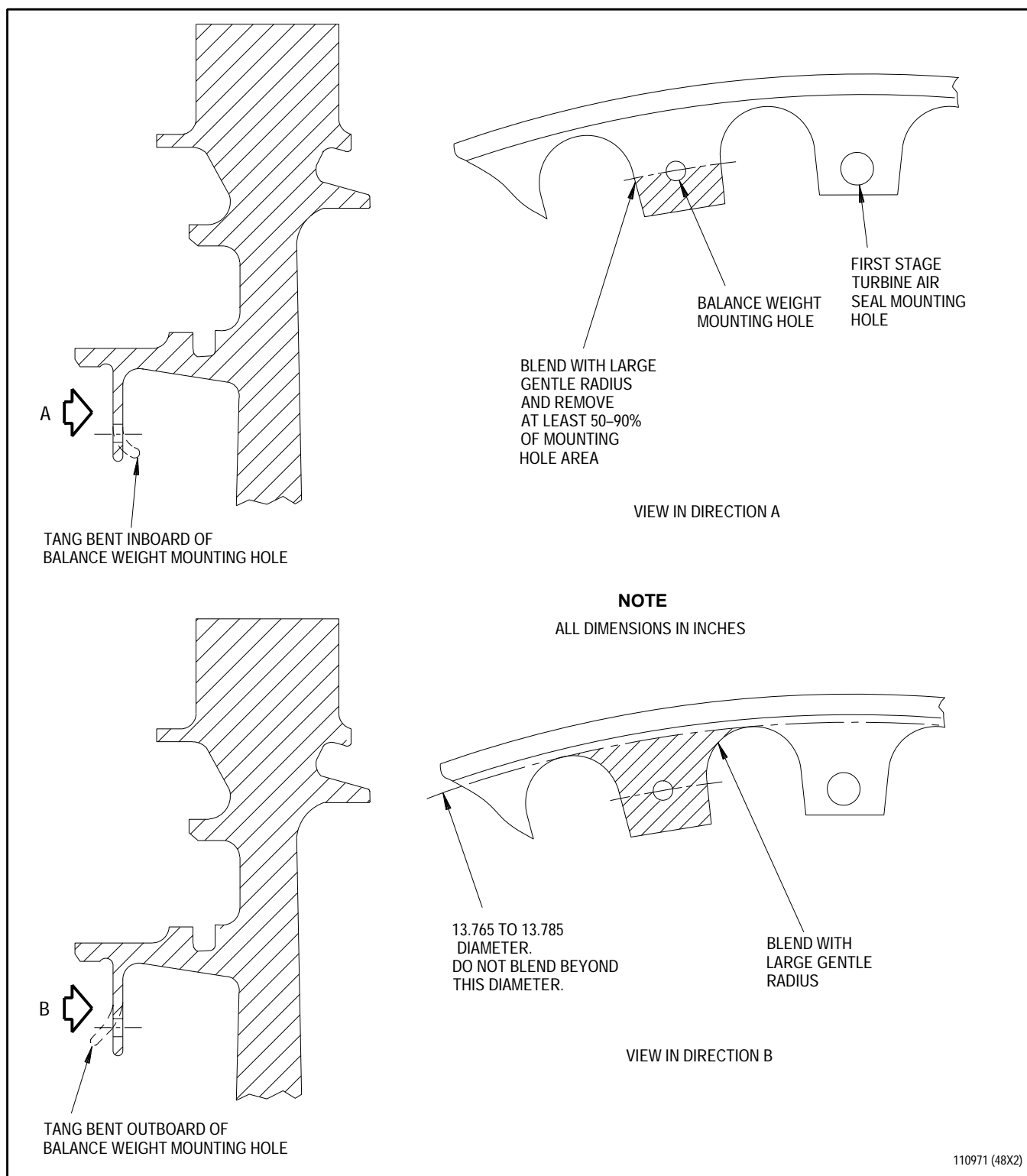


Figure 22. First Stage Turbine Disk Balance Weight Flange Tang - Removal

## 9. REAR COMPRESSOR DRIVE TURBINE ROTOR - COUNTERWEIGHT INSPECTION.

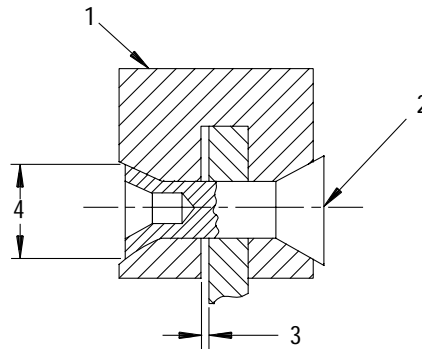
(See Figure 23.)

- a. Inspect to ensure disk counterweights are properly secured to disk flange per figure 23.
- b. If counterweights are not secured properly to disk flange, secure at original location as follows:
  - (1) Use PWA 51171 riveter to flare rivets to minimum diameter of 0.125 inch. Gap between counterweight and counterweight flange shall be 0.001 inch minimum after flaring per figure 23.
- c. If counterweights are damaged, replace as follows:

- (1) Mark each counterweight(1) and counterweight location using Colorbrite No. 2101 silver pencil or equivalent.
- (2) Remove and discard rivets(2).
- (3) Remove counterweights(1).
- (4) Install same size counterweights using new rivets at same locations marked at disassembly.
- (5) Use PWA 51171 riveter to flare rivets to minimum diameter(4) of 0.125 inch. Gap(3) between counterweight and counterweight flange shall be 0.001 inch minimum after flaring.



Do not replace a counterweight with one of a different size or in another position. Excessive engine vibration may result.



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1. Counterweight (typical PN 584943 or PN 584944)
2. Rivet
3. 0.001 inch minimum gap diameter
4. Flare rivets to 0.125 inch minimum diameter

**Figure 23. Counterweight - Inspection**

# **10. FIRST STAGE TURBINE BLADE FRONT RETAINING PLATE - BLEND REPAIR**

(See Figure 24.)



Failure to avoid specified areas during blending may result in damage to retaining plate.

- a. Hand blend retaining plate using blending stones and crocus cloth. Refer to T.O. 2J-F100-53-1, WP 091 00.
- b. Hand blend retaining plate to following criteria:
  - (1) No blending in flange OD radius, flange ID radius, or cooling holes per figure 24.
  - (2) Width to depth ratio (aspect ratio) shall be 15 to 1.
  - (3) All blending shall have 0.125 inch minimum radius.
  - (4) Surface finish of all blends shall be as smooth as or smoother than original or adjacent surface finishes.
  - (5) All blending must adhere to inspection limits. Refer to T.O. 2J-F100-53-8, WP 302 00.
- c. Fluorescent penetrant inspect all blending. Refer to T.O. 2-1-111, SPOP 82 and T.O. 2J-F100-9. No cracks allowed.

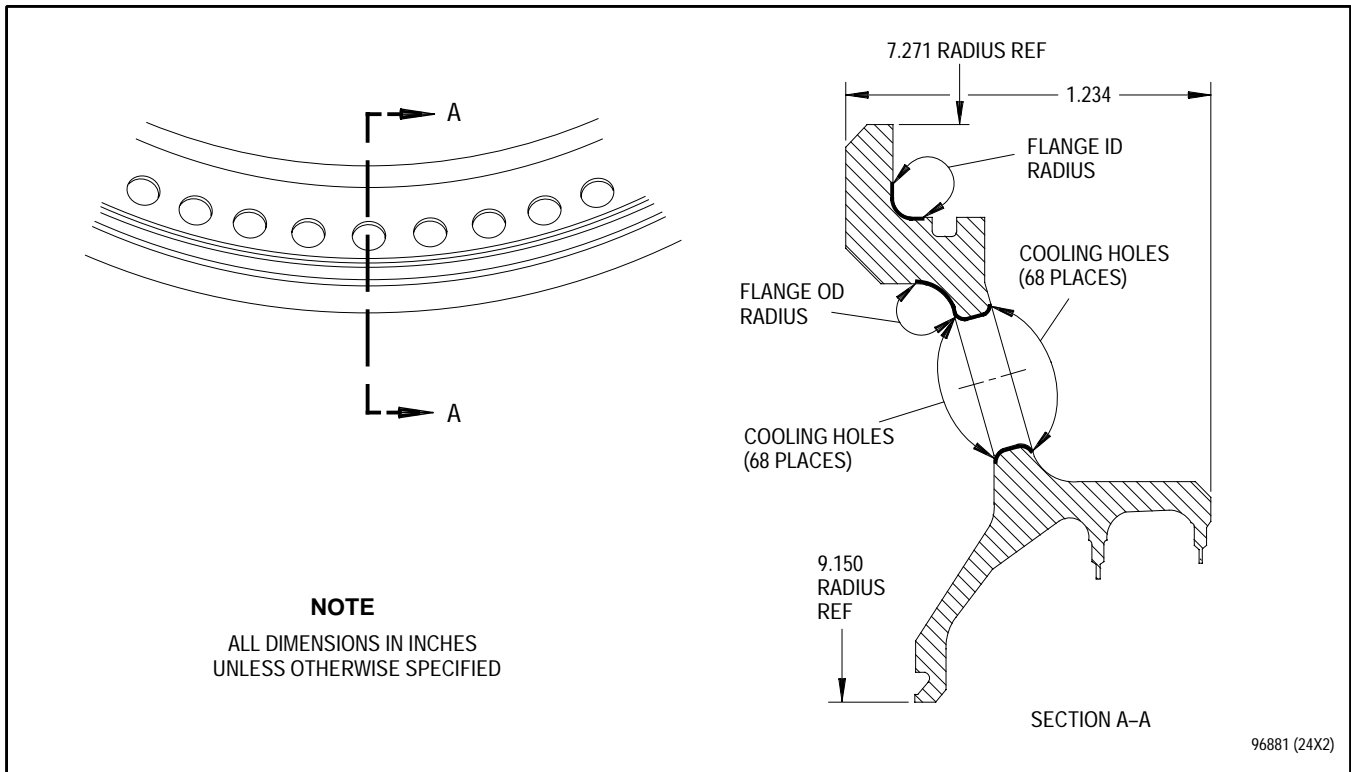


Figure 24. First Stage Turbine Blade Front Retaining Plate - Blend Repair